

In re National Collegiate Athletic Association Student-Athlete Concussion Injury Litigation
Expert Report of Bruce Deal Regarding the Medical Monitoring Fund
July 28, 2014

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Background and Assignment

Our team was asked by counsel for the NCAA athletes to analyze the anticipated costs and timing of the benefits available to athletes in the proposed settlement of the class action matter *In Re: National Collegiate Athletic Association Student-Athlete Concussion Litigation*. The settlement calls for the NCAA to provide funding of up to \$70 million to pay for the costs over 50 years associated with the settlement, which include legal, administrative, notification, travel, and medical testing costs, among others. Throughout this report, we will refer to this as the “Fund”.

The medical testing benefits will require current and former NCAA athletes to self-select for the benefits, complete a Questionnaire, be qualified for testing via the Questionnaire answers, and obtain testing from an authorized testing center. As a result, it is not possible to know with certainty exactly how many athletes will ultimately complete testing, and what the full program costs will be. Given that the Fund has been capped at \$70 million, counsel has asked our team to evaluate the available data and offer our opinion as to whether it is likely that the Fund will be adequate to provide benefits to all qualifying athletes who complete the required steps and request testing.

Qualifications

Analysis Group was asked to assemble a team of professionals from various disciplines (the “Committee”) who together had the appropriate expertise to estimate whether the proposed Fund would likely be adequate to provide benefits to qualifying athletes. The assembled team, summarized briefly below (with longer biographies included in Exhibit B), have expertise in medical, statistical, economic, litigation consulting, and actuarial fields.

Dr. Robert C. Cantu – Dr. Cantu is a physician and researcher, and is Clinical Professor, Department of Neurology and Neurosurgery and Co- Founder and investigator of the CTE Center, Boston University School of Medicine. He has particular expertise in sports-related athletic cervical spine and head injuries.

Mr. Bruce Deal – Bruce is an economist and Managing Partner with Analysis Group, Inc. He has expertise in statistical and economic analysis and has worked on dozens of class action matters over the past two decades.

Dr. Matthew Barrett – Matthew is a Vice President with Analysis Group, Inc., with expertise in healthcare matters.

Dr. Lynn Huynh – Dr. Huynh is an epidemiologist and health economist with Analysis Group, Inc. She has expertise in the statistical analysis of health outcomes.

Ms. Kimberly Shores – Kim is an actuary and Vice President with Lewis & Ellis, Inc. Actuaries and Consultants. She has expertise in healthcare and health insurance matters.

Summary of Findings

We believe that the Fund is adequate to meet its expected obligations. This opinion is based on modeling an appropriately conservative range of values. Specifically, the Fund is adequate under scenarios that assume conservative values for the main drivers of Fund economics: incidence and prevalence of the

conditions that testing aims to detect; actual participation rates for those who have the condition; the number of tests each tested individual receives; and the cost of each test.

Table 1 below provides a summary of our findings regarding Fund financial adequacy, under assumptions the Committee views as appropriately conservative, and also under sensitivity scenarios reflecting more conservative assumptions than the Committee believes likely.

Table 1. Summary of Fund Adequacy Modeling.

Sensitivity Definitions					
Parameter	Baseline	Sensitivity 1	Sensitivity 2	Sensitivity 3	Sensitivity 4
Take Rate	10%	15%	15%	25%	25%
Initial Test Cost - PCS	\$1,431	\$1,431	\$1,845	\$1,431	\$1,845
Initial Test Cost - CTE	\$2,198	\$2,198	\$2,528	\$2,198	\$2,528
Initial Test Cost - Imaging	\$2,477	\$2,477	\$2,725	\$2,477	\$2,725
Test Inflation	3.7% with in vivo CTE test in 15 years	3.7%	3.7%	3.7%	3.7%

Fund Adequacy	Fund adequate by ≥ \$30M	Fund adequate by ≥ \$30M	Fund adequate by ≥ \$30M	Fund adequate	Fund adequate
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Legend	Sensitivity adjustment from Baseline
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Approach to Modeling Fund Economics

Summary

We developed a financial model of annual Fund inflows and outflows over its 50 year intended life, to determine whether it was adequate for its purpose.

Inflows comprise payments from the NCAA and earnings on any capital balances. As a baseline, the model assumes that funding comes in the following tranches: \$30M at Fund establishment (“year 1”), and two tranches of \$20M each at 10 year intervals (years 11 and 21). This reflects our understanding of NCAA’s intended disbursement schedule. We note, however, that the Agreement makes provision for early partial drawdowns of the later Tranches, if initial funds are exhausted before the scheduled disbursement.

Outflows comprise initial legal and professional fees, initial costs to establish the necessary infrastructure, Class notification costs, ongoing administrative costs, and testing costs. Estimates of legal and professional fees were derived from the Settlement Agreement. Estimates of other costs were derived from an analysis of notification requirements, Screening Questionnaire volumes and costs, test volumes and costs, and associated administrative requirements.

As a sensitivity analysis, we also considered the implications for the Fund of potential inflows from subrogation to other insurers. This situation would arise where a third-party insurer would pay for all or a portion of the medical testing, thus reducing the net cost to the Fund. The actuarial expertise available to the Committee consider that it is reasonable to assume subrogation rates of up to 70%, based on the age-distribution of test takers and expected third-party coverage status by age cohort. However, to ensure that

estimates are conservative, all model results assume that the Fund bears the entire cost of all tests (and administration) without any inflows from subrogation.

In epidemiology terms, the athletes who have the conditions at issue are individuals who have a specific disease. Estimates of test volumes were developed from the starting point of the epidemiology of the disease states of interest. However, our modeling does not assume that only diseased class members will present to the Fund. Some non-diseased individuals are assumed to present for screening, and to be deemed eligible for testing based on that screening, at rates that reflect the quality of information individuals have about their medical condition and athletic history and the quality of information that a well-designed Screening Questionnaire can elicit about the probability of disease. Estimates for these rates reflect the Committee's collective expertise and judgment and are explained below.

Model parameter values reflect the Committee's research and joint expertise, and are deliberately conservative. For further assurance of the Fund's adequacy, the Committee also modeled as sensitivity analyses various scenarios in which key parameters are assigned much more conservative values than the Committee thinks are likely.

Underlying Epidemiology

Given the intended scope of testing, and the nature of potential long-term health consequences of traumatic brain injury, two disease states are of interest: Post-Concussion Syndrome (PCS) and Chronic Traumatic Encephalopathy (CTE). Both of these are discussed in more detail below.

PCS

Concussion, or mild traumatic brain injury (mTBI), is characterized by the rapid onset of cognitive impairment resulting from mechanical trauma to the head. Concussion is typically self-limited and spontaneously resolves; about 80% of concussions resolve within 7-10 days of impact. Most of the remaining 20% of injuries resolve in the weeks following the injury. However, in rare cases, symptoms can continue for months or years. Symptoms that endure for more than one month comprise Post-Concussion Syndrome (PCS), which occurs in about 15% of all concussions. Most PCS cases do eventually resolve, but some (up to around 1% of all concussions) never do so. Subjects with suspected persistent PCS are apt subjects for testing under the monitoring program. Testing for persistent PCS will be conducted via PCS-specific tests under the monitoring program, and will constitute a subset of the overall testing to be considered by the Medical Science Committee (the oversight committee specified in the Settlement) as appropriate under the Settlement. Henceforth, we will refer to these tests as "PCS tests".

CTE

The other disease state of interest is Chronic Traumatic Encephalopathy (CTE). CTE is a longer-term outcome of repetitive head trauma. While CTE cannot currently be diagnosed with certainty without an autopsy of brain tissue, the symptoms of CTE are the subject of current research and understanding.

Unlike PCS, whose onset coincides with a discrete concussive impact, the symptoms of CTE present later in life. CTE involves progressive neuro-degeneration characterized by the widespread deposition of hyperphosphorylated tau (p-tau) as neurofibrillary tangles. CTE is clinically associated with symptoms of irritability, impulsivity, aggression, depression, short-term memory loss and heightened suicidality that usually begin 8-10 years after experiencing repetitive mild traumatic brain injury. With advancing disease, more severe neurological changes develop that may include dementia, gait and speech abnormalities and

Parkinsonism. In late stages, CTE may be clinically mistaken for Alzheimer's disease or frontotemporal dementia. Unlike the behavioral symptoms, which typically appear in roughly the age span 35 – 45, these dementia-like symptoms typically appear in the age span 50 – 60.¹

Although the symptoms of CTE may resemble Parkinsonism, frontotemporal dementia, or Alzheimer's disease,² the age of onset of CTE is earlier than is typical of these other diseases. A subset of cases with CTE are associated with motor neuron disease (MND). Subjects with suspected CTE are apt candidates for the more extensive testing to be considered by the Medical Science Committee as appropriate under the Settlement. Henceforth, we will refer to the complete set of testing referred to in the Settlement as "CTE tests", for this reason. To be clear however, the CTE tests include the PCS testing referred to above, but are expected to be more extensive (and thus more expensive) than PCS testing. These age-of-onset and presentation differences will allow the program to focus on identifying CTE as opposed to the more general presentation of dementia and related diseases, which are not intended to be the focus of the program.

The relationship between CTE and PCS is not well understood. However, it is not believed that the CTE population is a subset of the PCS population. In fact, repeated sub-concussive impacts may result in CTE, i.e., without any history of full concussion. That said, there may be substantial overlap between the two populations. Since the degree of overlap is unknown, the financial model treats them as two entirely separate populations in order to be conservative in the analysis. Its estimates of test volumes paid for by the Fund are therefore conservatively inflated in proportion to the level of overlap: true costs will be that much lower.

The natures of these diseases are such that the Committee believes that most Class members and their families will be able to readily tell—when given appropriate information and educational materials--whether they are experiencing current symptoms that correlate with the corresponding disease state, and are thus appropriate subjects for testing. The Screening Questionnaire should be able to filter out most respondents not appropriate for testing, though our modeling has recognized that this process will not be perfectly accurate. To be specific, our modeling recognizes that a substantial fraction (up to 25%) of test subjects may not have the underlying diseases.

Estimates of test volumes were based on epidemiological estimates of the sizes of the diseased populations within the Class. Starting from the sizes of the diseased populations, estimates were developed of the number of people who would seek testing (i.e., complete a Screening Questionnaire), and the number of screened individuals who would be deemed eligible for testing (and hence would impose significant cost to the Fund). Each of those groups was assumed to contain a proportion of non-diseased individuals. To develop the estimates of the size of the diseased populations, a review of the medical literature was conducted to identify appropriate epidemiological assumptions, and was supplemented by the clinical and epidemiological expertise resident in the Committee.

In the following sections, we present our estimates of the size of the class population, the size of the diseased population, and our corresponding estimates of the proportions of that population likely to

¹ Expert report of Dr. Cantu, M.A., M.D., F.A.C.S., F.A.C.S.M., *Arrington v. National Collegiate Athletic Association*, No. 1:11-cv-06356 (N.D. Ill.) (Dkt # 180).

² Expert report of Dr. Cantu, M.A., M.D., F.A.C.S., F.A.C.S.M., *Arrington v. National Collegiate Athletic Association*, No. 1:11-cv-06356 (N.D. Ill.) (Dkt # 180).

present with PCS or CTE. These are used to estimate the volume of class members who will present for testing, based on the participation rate (the percentage of eligible diseased members who complete the process and qualify) among diseased members as well as among non-diseased members (“overflow”).

Initial Class Population and Concussion Rates

Based on NCAA data and US mortality data, the class population comprises 4.2 million current and former male and female student-athletes in all NCAA-sanctioned or varsity sports. The NCAA has collected detailed information on annual participation rates in intercollegiate athletics, disaggregated by sport and sex, beginning with the 1981-82 academic year. Between 1956-57 and 1980-81, NCAA maintained statistics of a similar nature, but participation rates are available only at 5-year intervals, and available statistics include recreation programs in addition to varsity sports. Although these data are therefore not directly comparable, and information prior to 1981 is less complete, these data are the best available information on the class size. Inclusion of student-athletes in recreation programs is conservative.

The number of individuals in the class was derived from the NCAA’s participation estimates using an assumed average of four seasons per student-athlete. The Committee considers this four season assumption reasonable, as attrition of some student-athletes is offset by the phenomenon of red-shirting, wherein student-athletes participate in five years of athletics on a team.³ Table 2 below summarizes the distribution of class membership by sport group and sex. Because concussion rates vary by sport, we have reported rates of participation in football, other contact sports including basketball, field hockey, ice hockey, lacrosse, soccer and wrestling (see Table 3), and non-contact sports separately. We estimate the class population to include approximately 700,000 former football players, 1,100,000 other contact sports players, and 2,400,000 non-contact sports players.

Table 2. Mortality-adjusted Class Membership by Sport Group and Sex.

Sport Group	Men	Women	Total
Football	717,028	—	717,028
Other Contact Sports	623,126	450,330	1,073,456
Non-contact Sports	1,576,817	851,865	2,428,682
Total	2,916,971	1,302,195	4,219,166

Sources:

NCAA Sports Sponsorship and Participation Rates Report: 1981-82 — 2011-12.
National Vital Statistics Reports, Vol. 61, No. 3, September 24, 2012. Table 1.

Conservatively, we did not exclude current or former NFL players from our estimates, though they may elect not to participate in this settlement given the NFL’s ongoing programs for dealing with concussion-related issues.

Rates of concussion and other head trauma vary significantly across sporting activities, as reported in Table 3. The number of concussions among football players is significantly higher than in other contact sports;

³ In a 2012 publication, the NCAA cites average number of season rates ranging between 3.5 and 4.5 when estimating the number of freshmen and seniors (respectively) participating in athletics and acknowledges the offsetting impacts of attrition and red shirting. “Estimated Probability of Competing in Athletics Beyond the High School Level.” NCAA. http://www.ncaa.org/sites/default/files/Probability-of-going-pro-methodology_Update20123.pdf.

because of the unique proclivity for concussions in football and the large number of participants, the Committee models football and other contact sports separately.

Table 3. Annualized Number of Concussions in “Contact” NCAA Sports, 2004-2009.

Sport Group	Concussions	
	Annual Concussions	Per 1,000 Athletes
Football	3,255	42
W. Soccer	1,150	41
M. Soccer	675	26
W. Basketball	165	9
W. Field Hockey	137	20
M. Basketball	133	6
Wrestling	51	7
W. Ice Hockey	31	14

Source:

Exhibit 70: Concussions in NCAA from 2004-2009.

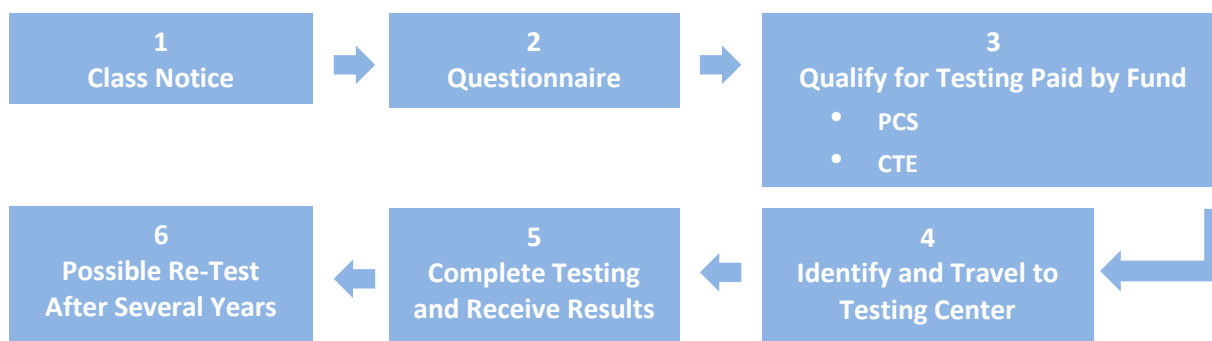
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NCAA Sports Sponsorship and Participation Rates Report,
1981-82 - 2011-2012.

The size of each group by year and the rate of concussions by sport were used to develop the baseline estimate of the number of athletes who may have suffered concussions. These groups, in turn, were used to estimate the sizes of the PCS and CTE populations. As noted, although there is undoubtedly overlap between these populations (i.e., some proportion of athletes with unresolved concussions (PCS) also go on to develop long-term cognitive or behavioral problems [CTE]), we conservatively modeled them as entirely distinct populations.

Estimated Number of Tests

Starting with the estimate of the number of athletes who suffered a concussion during their NCAA athletic career, we estimate the population of athletes deemed to be affected by both PCS and CTE, as described in more detail below. Estimates of test volumes by year were developed via assumptions for a “Participation Rate” based on the disease estimates and “Overflow Rates” (screenings requested by healthy members of the population, and tests conducted on a fraction of those people), and the number of tests each tested individual receives over the Fund’s lifespan, since the Settlement allows for more than one test per athlete over time. **Error! Reference source not found.** details the flow of student-athletes receiving PCS or CTE testing.

Figure 1. Conceptual Flow of an Individual Student-athlete's Engagement with the Fund.

Given the different epidemiology, the dynamics of test-taking among the PCS and CTE populations are quite different from each other. Because PCS is essentially unresolved symptoms following a trauma, all PCS class members should already be symptomatic. Thus the relevant population already exists, and Screening Questionnaire completion and testing should be concentrated shortly after the Fund is established and the class is notified of the settlement. By contrast, a sizeable proportion of the CTE population, (which presents after decades of no symptoms) is still currently asymptomatic, and new cases will continue to present over almost the Fund's lifetime. Figure 2 and Figure 3 below illustrate these phenomena.

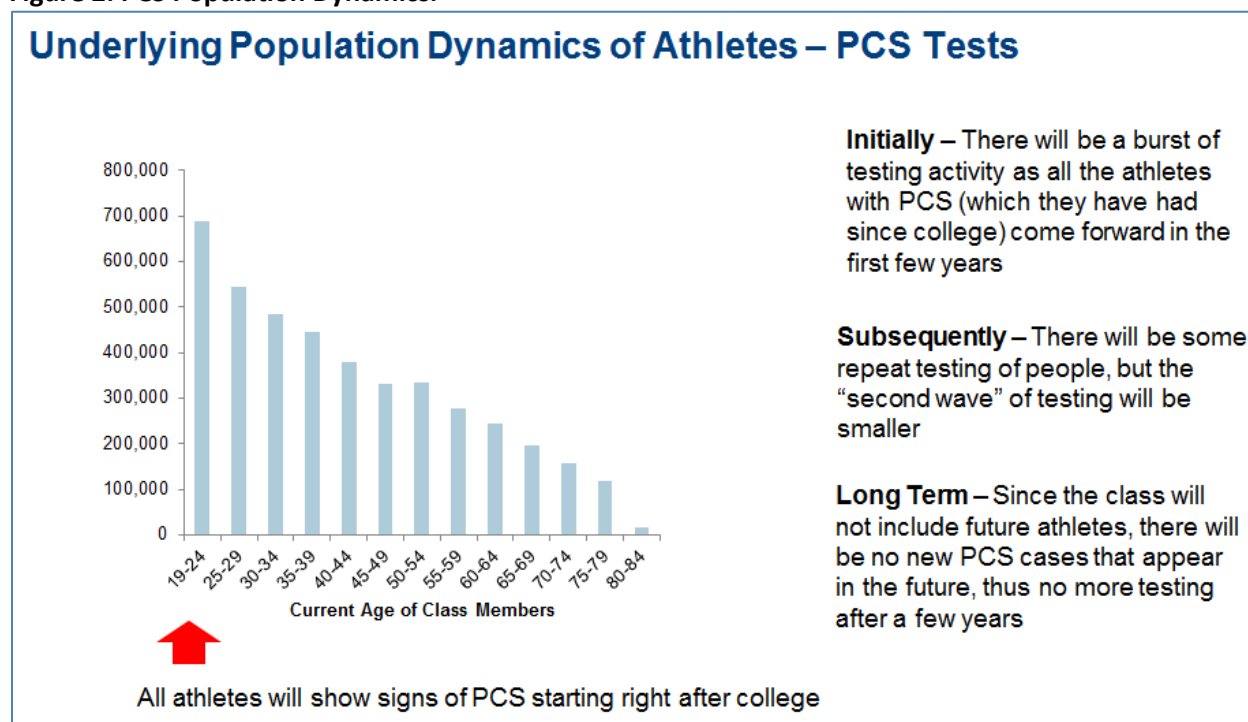
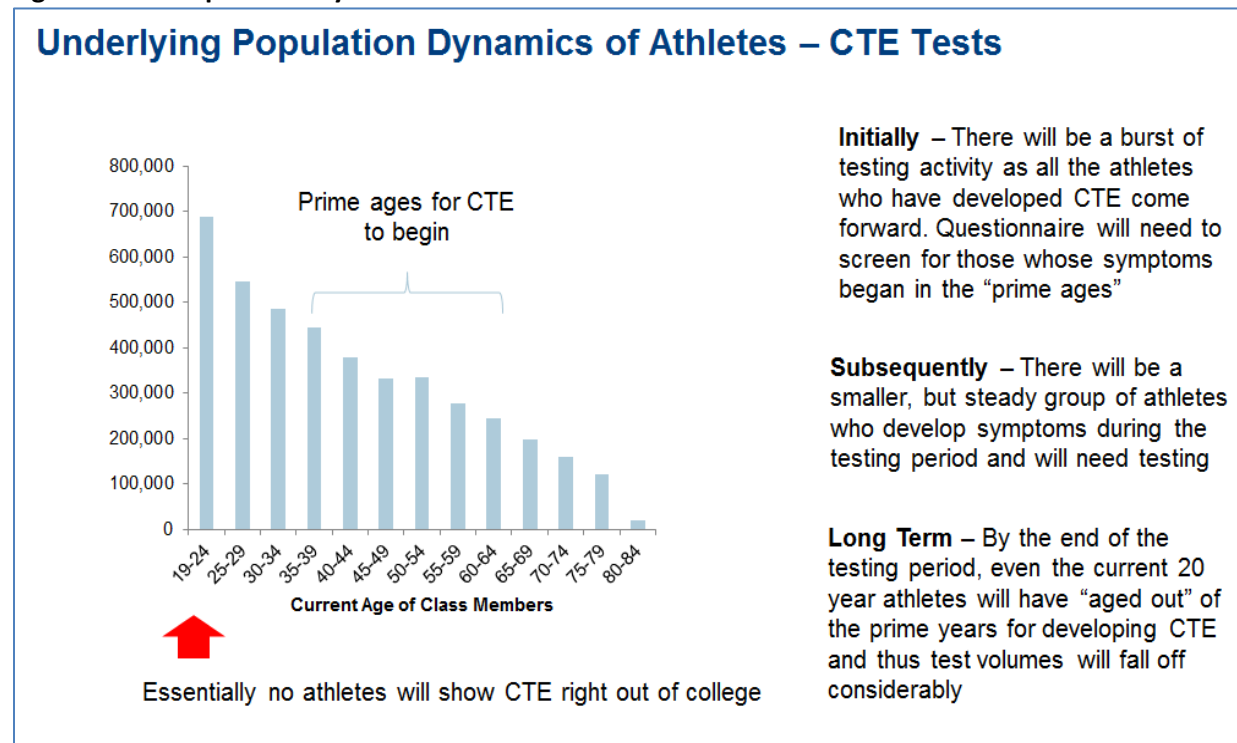
Figure 2. PCS Population Dynamics.

Figure 3. CTE Population Dynamics.

PCS Population Size Estimates

The size of the PCS population was based on estimates of concussion rates among contact sports players, and on clinical and epidemiological information on the proportion of concussions that remain resolved long enough for patients to present to the Fund (i.e., one year or more).

Concussion rates have been collected by NCAA since 1988, when approximately 250 member NCAA schools began voluntarily providing athletic injury information to the NCAA Injury Surveillance System (ISS).⁴ Submission to the NCAA’s voluntary registry provides information on the rates of concussion in each sporting code.

Prolonged PCS is a rare concussive outcome. The literature suggests that around 1% of concussions result in symptoms that are not resolved within one year of injury.⁵ Some studies have reported higher rates, but have drawn from populations that have experienced very severe head trauma. The Committee considers that an unresolved PCS rate of 1% at 1 year is a reasonable figure for this population. However, we used more conservative assumptions for modeling purposes, to reflect the existence of higher estimates: thus the model assumes that 5% of concussions do not resolve within the first year after head trauma, declining to 1% within five years of head trauma.

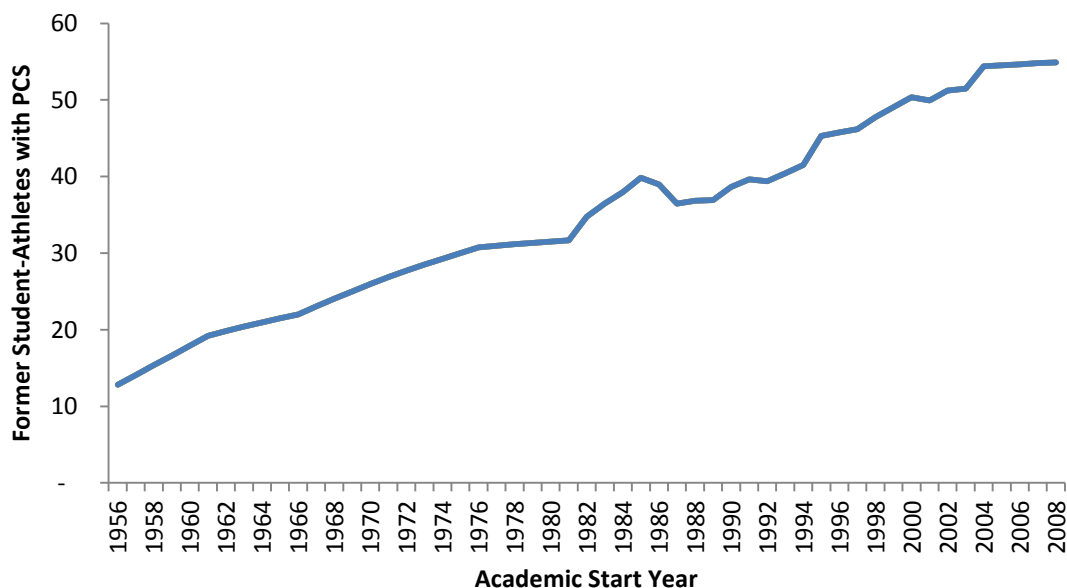
⁴ Dick, Randall et al. “National Collegiate Athletic Association Injury Surveillance System Commentaries: Introduction and Methods.” *Journal of Athletic Training*. 2007;42(2):173–182.

⁵ McCrory P, Meeuwisse WH, Kutcher JS, Jordan BD, Gardner A. “What is the evidence for chronic concussion-related changes in retired athletes: behavioural, pathological and clinical outcomes?” *Br J Sports Med*. Apr 2013;47(5):327-330.

The Committee notes that many concussions go undetected, and thus unreported. While there is uncertainty over the overall rate of undetected concussion, the available evidence suggests that unreported concussions may comprise up to 50% of all concussions.⁶ Unreported concussions are likely overwhelmingly to be “simple” or relatively mild concussions (e.g., those without loss of consciousness or post-traumatic amnesia). The more severe concussions likely to result in PCS are inherently less likely to go unreported, however many may still be. To ensure conservative estimates, the Committee adjusted reported concussion rates upwards, on the assumption that 25% of concussions resulting in PCS are unreported or not diagnosed. The Committee believes this is conservative, given the symptoms associated with PCS.

In order to develop our estimate of the starting number of NCAA athletes with PCS unresolved five years or more after athletic trauma, we combine the number of athletes by sport category, the rate of unresolved concussion, and overall population mortality rates to estimate the number of athletes per year still alive with PCS. These data are shown graphically in Figure 4, by year of original participation. As one can see, this ranges from just over 10 to just over 50 athletes per year.

Figure 4. Population of student-athletes with PCS unresolved five years or more after athletic trauma, by academic start year.



CTE Population Size Estimates

The epidemiology of CTE is less well understood than the epidemiology of PCS. In part, this reflects the relatively diffuse nature of the symptoms, which typically appear years after exposure, although much sooner than more common cognitive diseases such as Alzheimer's. In part, the lack of specific epidemiology data reflects the difficulty in reliably diagnosing CTE, which involves behavioral and cognitive symptoms that can be difficult to reliably detect, and can result from distinct conditions. In fact, at present, there is no definitive *in vivo* diagnostic test for CTE among athletes still alive; to confirm a CTE diagnosis

⁶ McCrea M, Hammeke T, Olsen G, Leo P, Guskiewicz K. “Unreported concussion in high school football players: implications for prevention.” *Clinical Journal of Sport Medicine*. 2004 Jan;14(1):13-7.

requires post mortem autopsy. These factors mean that our estimates of the affected CTE population within the Class are less certain than for PCS. That said, there is a growing body of research on the prevalence of CTE, which we used to develop estimates that we believe are conservative.

Estimates for the size of the CTE population were developed starting with existing epidemiological and clinical literature on the relative risk of cognitive or behavioral impairment among former athletes. These studies are predominantly focused on former NFL players, reflecting the extent of head trauma to which NFL players are exposed and the emerging evidence that this population is at risk to develop CTE. Limited information exists on CTE prevalence in populations other than former boxers, NFL players, wrestlers and soccer players.⁷

Accordingly, we modeled relative CTE prevalence in the former-NCAA population with reference to the better-established prevalence within the former-NFL population. Since former-NFL players have been subject to powerful impacts over a longer period than former NCAA student-athletes, the prevalence of CTE in the former population is an upper bound for its prevalence in the latter.

In addition, as with PCS, the risk among former NCAA athletes of developing CTE can be expected to vary significantly depending on the specific sports they played, and their resulting exposure to head trauma. Our model reflects this by assuming that the risk of developing CTE, for former players of a given sport, is proportional to the annual concussion rate for players of that sport. With the exception of women's soccer, football has a significantly higher reported concussion rate than other NCAA sports – roughly twice the rate observed in other contact sports, and many times higher than that in non-contact sports.⁸ Under-reporting of concussions is likely to be higher in football than in other contact sports, since football offers more in-game “down time” during which the immediate symptoms of concussion can subside. The Committee therefore believes that the relative rates for other contact sports are conservatively high – if underreporting is higher in football, then the true relative rate for other contact sports will be lower than suggested by reported figures.

Although it is relatively well studied, the prevalence of CTE among former NFL players remains uncertain. Existing studies are small in scale and subject to selection bias, given the need for post-mortem to make a definitive diagnosis of CTE. Studies have been conducted on subjects who have volunteered, who can be presumed to be more symptomatic than the former NFL population as a whole.⁹ Such selection bias will tend to exaggerate estimates of CTE prevalence in the NFL population.

As an example, one study reported that retired NFL players with 3 or more concussions face elevated risk, between 3 and 5 times as high as the players without a history of concussion for a range of cognitive or neurological disorders that may be associated with CTE.¹⁰ Such disorders include various kinds of cognitive impairment, memory impairment, dementia, neurodegenerative death, and mood/behavioral issues. The

⁷ McKee AC, Cantu RC, Nowinski CJ, et al. “Chronic traumatic encephalopathy in athletes: progressive tauopathy after repetitive head injury”. *J Neuropathol Exp Neurol*. Jul 2009;68(7):709-735.

⁸ Daneshvar DH, Nowinski CJ, McKee AC, Cantu RC. “The epidemiology of sport-related concussion”. *Clinics in Sports Medicine*. 2011 Jan;30(1):1-17, vii.

⁹ Gavett BE, Stern RA, McKee AC. “Chronic traumatic encephalopathy: a potential late effect of sport-related concussive and subconcussive head trauma”. *Clin Sports Med*. Jan 2011;30(1):179-188, xi.

¹⁰ Guskiewicz KM, Marshall SW, Bailes J, et al. “Association between Recurrent Concussion and Late-Life Cognitive Impairment in Retired Professional Football Players”. *Neurosurgery*. 2005:719-726.

Committee also reviewed a paper citing the hazards ratio of dementia was 1.58x among former high-school football players compared with non-football players, albeit with a small sample size.¹¹ A hazard ratio greater than 1.0x reflects a higher risk than the baseline population. Relevant epidemiological data on the prevalence of CTE-like symptoms of cognitive impairment among former football players are summarized in Table 4.

Table 4. Summary of Relative Risk Compared to the General Population (Hazard Rate) for Football Players.

Author	Year	Population (size)	Endpoint	Hazard Rate (Risk Relative to General Population)
Guskiewicz	2005	2,252	Neuro-cognitively confirmed memory impairment without Alzheimer disease	3
Weir	2009	1,063	Dementia, Alzheimers, or other memory-related disease (self-reported)	5.1
Savica	2005	578 (Former HS FB players [n=438] and non-FB players [n=140] between 1946 – 1956)	Cognitive impairment	1.5 ¹²

Based on these data and professional judgment, the Committee estimates the risk of CTE-like symptoms among former NCAA football players to be three times as high as they are in the general population. Since this is roughly the level of risk elevation seen among former NFL players, the Committee regards this as conservative. Based on relative concussion rates, the Committee estimates the risk for non-football contact sports players to be half as high as this (i.e., 1.5 times as high as the general population).

These relative risks were applied to baseline rates of comparable age-specific cognitive impairment in the general population. Although CTE can present as mood/behavioral or as cognitive impairment, the available data suggest that the vast majority of those presenting initially with mood/behavioral symptoms later present with cognitive symptoms (90%).¹³ In addition, the epidemiology data for cognitive impairment, both in the general population and among former athletes, is somewhat better than the data on behavioral impairment. Accordingly, we have treated rates of age-specific cognitive impairment as a proxy for rates of CTE.

¹¹ Savica R, Parisi JE, Wold LE, Josephs KA, Ahlskog JE. "High school football and risk of neurodegeneration: a community-based study". *Mayo Clin Proc.* Apr 2012;87(4):335-340.

¹² P = 0.55

¹³ Stern RA, Daneshvar DH, Baugh CM, et al. "Clinical presentation of chronic traumatic encephalopathy." *Neurology.* Sep 24 2013;81(13):1122-1129.

Estimates of baseline risk were drawn from available estimates of the prevalence of relevant forms of cognitive impairment. That baseline risk, of course, varies significantly with age; dementia and other forms of cognitive impairment are much more prevalent in the elderly population (e.g., 80+) than the rest of the population. Our focus, given the age of onset of CTE symptoms – including the cognitive symptoms that resemble dementia – was on the population with comparable symptoms between ages 35 – 65. Former class members who first develop symptoms of cognitive or emotional impairment above that age are not likely to be suffering from concussion-related CTE and are not strong candidates for testing under the program. We assume that the Screening Questionnaire will be designed to elicit relevant information about the history of those who complete the Questionnaire, including the age of symptom onset and athletic history, and that those with symptoms of cognitive impairment whose age of onset is inconsistent with CTE will not be eligible for tests. We note that this does not preclude class members from presenting to the Fund at ages older than 65. In fact, in the Fund's early years, we include in the group for testing those who are currently older than 65, but whose symptoms began earlier.

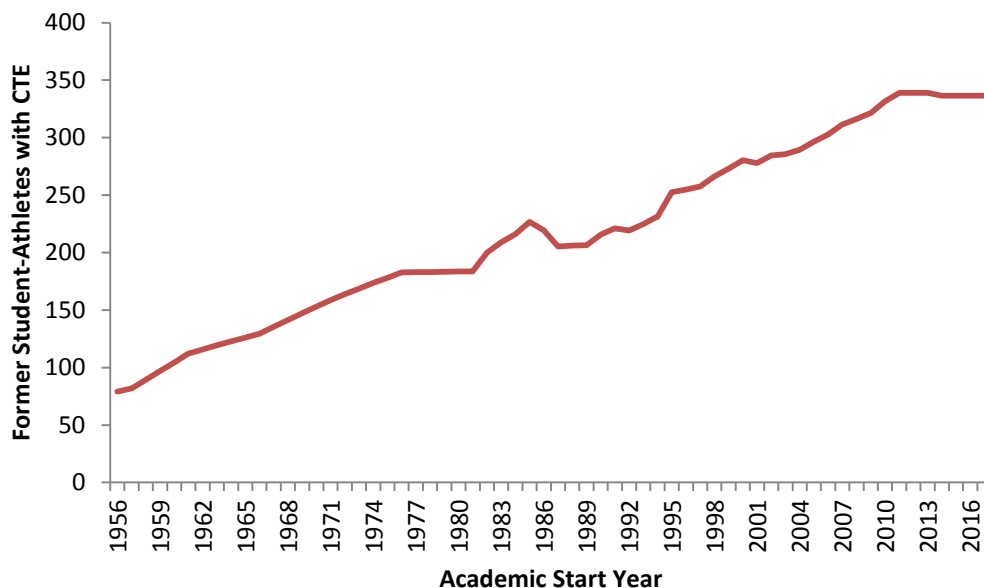
The best available data on the rates of dementia among younger populations is a 2003 study by Harvey that provides estimates of the age-stratified prevalence of dementia, in five-year bands, between the ages of 30 and 65. This study is based on a large-scale survey of a UK catchment area of 500,000 people, and was used as the basis for our baseline risk estimates. Because the set of cognitive symptoms associated with CTE is somewhat broader than dementia per se, the Committee doubled these rates to gain an estimate of baseline CTE risk, based on the findings from the 1997 Canadian Study of Health and Aging, which suggest that the rate of mild cognitive impairment is roughly twice that of dementia.¹⁴ Since dementia-like symptoms are a typical outcome of CTE, the Committee views using this larger population as the source of baseline risk estimates as conservative. While other studies have estimated risk levels for dementia and related symptoms, we did not find any additional scientific studies with credible estimates of relative rates in the younger population at issue in this case.

As discussed, within the 35 – 65 age range, we took the risk of CTE for former football players to be 300% of the resulting age-specific population baseline rate of relevant cognitive impairment, and 150% that rate for non-football contact sports players. We regard this level of risk as conservative. Given the Fund's purpose, and the expectation that the Screening Questionnaire will eliminate individuals with no history of head trauma, CTE tests are not modeled in the non-contact sports population.

Figure 5 shows the resulting modeled population of student-athletes eventually developing CTE, combining the baseline population estimates and the relative risk factors for football and other contact sports.¹⁵ As one can see, we estimate that there will be between 50 and 300 cases of CTE per academic year.

¹⁴ Graham JE, Rockwood K, Beattie BL, Eastwood R, Gauthier S, Tuokko H, et al. "Prevalence and severity of cognitive impairment with and without dementia in an elderly population." *Lancet*. 1997 Jun 21;349 (9068):1793-6.

¹⁵ The number of student-athletes developing CTE increases across academic start year because cohort sizes increase over time (from 29,042 in 1956 to 114,813 in 2013). In addition, newer class years have lower mortality rates during the 50-year life of the Fund, allowing for more student-athletes to age into CTE.

Figure 5. Population of Student-athletes with CTE by Academic Start Year.

Participation Rates (“Take Rates”)

Take Rate Among Diseased Individuals

In a class action, the participation rate or “take rate” is the percentage of those eligible who will complete the process and access the provided relief. In this case, the vast majority of the class members—all NCAA male and female athletes during certain years—neither suffered a concussion nor were exposed to an accumulation of subconcussive hits and therefore will not develop either the PCS or CTE disease condition that would lead to testing. As a result, we are modeling the take rates as the percentage of those eligible (i.e. those who actually have PCS or CTE) who will complete all the steps in the process shown in Figure 1 above.

Take rates were informed by professional judgment and historical rates of uptake of past class settlements, where available to the Committee. Estimates of take rates were based primarily on settlements involving medical monitoring programs, as discussed below. Since there are relatively few such settlements, we also considered consumer class action settlements as a check on our findings.

Two of the past settlements the Committee considered involved medical monitoring programs. In *Klier v. Elf Atochem* (“Atochem”), \$6.46 million was allocated to a subclass to establish a Rule 23(b)(2) medical monitoring program due to “exposure to arsenic and toxic chemicals allegedly emitted by [a nearby plant].”¹⁶ Of the 12,657 eligible claimants,¹⁷ just 329 of the subclass member—less than 3% of the total subclass membership—opted to receive medical monitoring and just 221 (approximately 2%) attended their first monitoring examination.¹⁸ Only 46 members completed all three rounds of scheduled screening.

¹⁶ *Klier v. Elf Atochem North America, Inc.*, 658 F.3d 468 (5th Cir. 2011).

¹⁷ Brief of Appellee, *Klier v. Elf Atochem North America, Inc.*, 2010 WL 7124828 (5th Cir. Nov. 29, 2010)

¹⁸ *Klier v. Elf Atochem N. Am., Inc.*, 658 F.3d 468, 472 (5th Cir. 2011)

The second medical monitoring program considered was the Fernald Medical Monitoring Program (FMMP). Although there are important differences between the FMMP and the NCAA program, the Committee found it an instructive analogue. The FMMP was maintained over an 18-year time frame by the U.S. Department of Energy (DOE) as part of a settlement of a class action dispute over the release of ionizing radiation and uranium particulates into the community of Fernald, Ohio, by a DOE uranium processing plant between 1952 and 1984. The FMMP was available to individuals who lived or worked within five miles of event site for a continuous two-year period between 1952 and 1984, and focused on general health promotion. The FMMP was the “largest medical monitoring program arising from class action litigation over environmental exposure” and achieved a take rate of roughly 25%.¹⁹ The Committee is confident that, given some important disanalogies between the two monitoring programs, it is reasonable to expect a significantly lower take rate among potential Fund claimants, as discussed in detail below.

Several considerations are relevant to determining take rates, including three factors:

- 1) the size and value of the benefit,
- 2) the effort required to claim the benefit, and
- 3) the level of awareness of eligibility for the benefit.

Even when these parameters favor uptake (i.e., benefit and awareness are high, but effort is low), take rates can be quite low. The Committee took these factors into account in considering an appropriate estimate for the take rate in this case.

As noted above, since there are relatively few historical settlements involving medical monitoring programs, the Committee also examined data on take rates for consumer class action settlements. Although they are less directly analogous to this settlement, consumer suits are much more numerous. In the interest of developing appropriately conservative estimates, we wanted to supplement the analysis above by reviewing these data, to ensure that those take rates were consistent with our analysis here. Discovery materials pursuant to this case shows that take rates for consumer settlements are seldom more than 2-3%, and can be a much less than 1%.²⁰ Anecdotally, this is even true of settlements offering significant monetary benefits in the hundreds or even thousands of dollars per member.

Factor 1: The Size and Value of the Benefit

The potential benefit from making a claim on the Fund is access to the diagnostic medical testing at no out of pocket cost, plus potentially some travel reimbursement. Many class members may see utility in receiving these tests – particularly if the tests are expensive (e.g., at the conservatively high \$2,528 we model for the CTE test). Members who believe they are ill may also see benefit in receiving a positive test, and thus establishing the need for therapy, or potentially for establishing the basis for a case for compensation.

¹⁹ Wones, Robert, et al. “Medical Monitoring: A Beneficial Remedy for Residents Living Near an Environmental Hazard Site.” *Journal of Occupational and Environmental Medicine*. 2009 December; 51(12): 1374–1383. doi:10.1097/JOM.0b013e3181c558f1.

²⁰ Mayer Brown LLP. “Do Class Actions Benefit Class Members? An Empirical Analysis of Class Actions.” <http://www.classdefenseblog.com/files/2013/12/Mayer-Brown-Class-Action-Study.pdf>.

That said, the average utility to members of the test will be considerably lower than the cash cost of the test. Former athletes with no symptoms will likely perceive the utility of testing as being extremely low, and in any case they are not likely to qualify for testing. Furthermore, even for symptomatic class members, these tests may well be similar or identical to tests their commercial or government insurance would cover, even without the Fund's existence. For those members, the utility of receiving the testing via the Fund is limited to the out-of-pocket cost they would incur under their insurance coverage. Accordingly, the average value of the testing will be a modest fraction of the average out-of-pocket cost. Overall, the Committee believes that the medical testing available here provides roughly the same degree of benefit as that provided by the historical medical monitoring cases it considered.

It is worth noting that the benefits available under consumer class settlements are also often relatively low. Specifically, the benefits available under many of the historical consumer class action settlements which the Committee considered in developing estimates of the take rate were typically \$10 or less, though in some cases the benefits averaged hundreds or thousands of dollars per claim. Accordingly, taken by itself, the size of the benefit would suggest a take rate at the high end of the historical range of consumer class actions the Committee reviewed.

Factor 2: The Effort Required to Claim the Benefit

The scope of the Program will be finalized by the Medical Science Committee (MSC) upon Court appointment of the MSC members. For our analysis, we assume the Program will be structured to avoid inappropriate barriers to access, while also ensuring that resources are directed to medically appropriate uses. To achieve this goal, the Agreement stipulates that Fund applicants will need to complete a Screening Questionnaire. The Committee assumes that for this Questionnaire to fulfill its function, it will require class members to enter relatively extensive and detailed information about their athletic and medical history, and their current symptoms.

The intended process for providing tests is also relevant to understanding the effort involved in claiming the benefit. A potential class member may be less interested if it will require extensive travel to access the tests. The Settlement calls for the establishment of multiple testing centers nationwide at which testing will presumptively occur. We understand these will be distributed across the USA in alignment with overall population distributions. This means that the effort required to claim the benefit will include completing the Screening Questionnaire, engaging in relevant follow-up, and then perhaps up to a day or two of time and travel to attending a test at an approved institution.

To place this settlement in the context of the historical examples of class action settlements the Committee considered, establishing eligibility and making a claim can often be relatively straightforward in many of these settlements. For medical monitoring programs, the effort required to establish eligibility depends on the goals of the program and the breadth and dispersion of the population of interest. As noted above, in developing our estimates we analyzed the limited data available on such programs. In doing so, we must be sensitive to the inherently different nature of the NCAA monitoring program to those involved in the FMMP and Atochem matters. Both of these settlements involved relatively small and geographically concentrated populations, and involved monitoring of a relatively broad nature. Accordingly, establishing eligibility for these programs was relatively straightforward, based on geographic residency. In contrast, the NCAA program is very specific monitoring for PCS and CTE across a wide geographic and population base.

In the specific case of the FMMP, eligibility required two consecutive years spent living or working within five miles of the uranium plant site in Fernald, Ohio at any time between 1952 and 1984. No travel was required for testing, at least for current residents, who comprised a majority of claimants. In the case of the Atochem program, eligibility required that class members live or work within close proximity of the site of the chemical accident in the small community of Bryan, Texas.²¹

In consumer settlements, establishing eligibility is typically very straightforward. In many consumer cases, all a claimant need do is to complete a postcard or answer a brief online survey. This is even true for some settlements offering significant cash benefits. For example, in the Toyota involuntary acceleration settlement, claimants who were current had the option to get a brake override system installed at no cost (subject to some eligibility criteria) or receive a cash payment of up to \$125²² after completing an online claim form.²³ For former owners who sold their vehicles between September 1, 2009 and December 31, 2010, claimants could file a claim for diminished value; such claimants received between \$125 and \$5,977. The claim form was a simple two page document requiring claimants to enter the make and model of their vehicle, vehicle identification number, and personal address information, which they could submit online or through mail.²⁴

Taken by itself, then, the effort required to claim the medical monitoring benefit under the NCAA settlement is moderately high. In these situations, participation will be concentrated among those Class Members who are experiencing active symptoms which are interfering with their functional lives and for which they have not already received treatment. This high level of effort suggests a relatively low take rate compared with the historical examples the Committee reviewed.

Factor 3: The Level of Awareness of Eligibility for the Benefit

The Agreement stipulates a comprehensive publicity campaign in the first year of the Fund's existence, and a follow-up campaign ten years later. Our model assumes a multi-channel campaign, involving direct mail (physical and electronic), some media broadcast publicity, some publication advertising, and online advertising. Furthermore, the NCAA has relatively complete information about the identity and addresses of many potential class members, which is frequently not the case in class action settlements. Accordingly, the direct mail campaign can be expected to have relatively high awareness impact.

The nature of the substance of this case, and in particular its connection to potentially serious health impacts, is likely to generate more media attention than many class settlements receive. Notwithstanding this awareness, many eligible members are still likely not to be aware of the program. In addition, among those generally aware of the program, many may not be aware of their eligibility for testing. Although most class members can be presumed to know they are former NCAA student-athletes, most members' NCAA athletic participation was many years ago. For example, two thirds of the former student-athletes graduated a decade or more ago. Such members may not see that participation as relevant to their current medical status unless they are exhibiting active symptoms of either PCS or CTE. Taken by itself, the

²¹ RALPH KLIER, Appellant, v. ELF ATOCHEM NORTH AMERICA, INC., Defendant – Appellee. No. 10–20305.

²² Final payments to all such claims were \$125.

²³ “Toyota Economic Loss Website – Frequently Asked Questions,” accessed July 26, 2014, <https://www.toyotaelsettlement.com/Home/FAQ>.

²⁴ “Claim Form for Subject Vehicles Not Eligible to Receive the Brake Override System,” accessed July 26, 2014, http://www.toyotaelsettlement.com/pdf/v4_tmua1_claim-nonbos_011813.pdf.

Committee thinks that compared to other medical monitoring programs the Committee considered, awareness is likely to be relatively low given the passage of time and geographic dispersion.

Consider for example the FMMP program. Given the small and geographically concentrated class population (50,000 members, living within 5 miles of the plant), it is reasonable to suppose that awareness of the program was higher than the Fund could achieve, given its much more dispersed population. In addition, residence close to a uranium plant is highly salient to health concerns among class members – likely more so than past athletic activity. This is particularly true of residence near a site of well-known radioactive contamination, given the public’s tendency to over-estimate the dangers of radiation.^{25,26} Similar considerations apply to the Atochem program.

Compared to the consumer settlements the Committee also reviewed as a validity check on its take rate estimates, awareness is likely to be relatively high for this settlement, given the scope of the advertising campaign, the likely media coverage, and the serious nature of potential health impacts. Taken by itself, this suggests a relatively high take rate compared with historical consumer class action examples the Committee reviewed.

Overall Take Rate Conclusions

In light of these considerations, the Committee believes that a conservative estimate of take rate should be higher than those of typical consumer class action settlements (which are typically less than 5%), but lower than the 25% take rate observed in the FMMP program.

We think it is reasonable to assume that the take rate for the NCAA MMP will be intermediate between these points, and believe that a take rate of 10% is conservative. However, we have also modeled, as sensitivities, take rates of 15% and 25%.

Take Rate Among Non-diseased Individuals (Overflow)

The testing program is appropriately focused on class members exhibiting relevant disease symptoms for PCS and CTE. However, there will certainly be some “overflow” in both Questionnaires completed and tests completed, where non-diseased individuals will participate. Based on the clinical advice provided the Committee, we believe that this overflow can be kept to low levels, particularly for testing. Although the Screening Questionnaire will generate a substantial degree of self-selection, there will also be some Questionnaires completed by non-diseased individuals. We discuss this in more detail below.

Screening Questionnaires

PCS, as a phenomenon associated with unresolved concussions, is relatively transparent to sufferers. Although some concussions go unreported, most people who have experienced a concussion resulting in PCS will be aware of that fact. More importantly, in this context, “false positives” (people who think they may have PCS but in fact do not) will be relatively rare. Most people who have not experienced a concussion during their college athletic years know that they have not done so. Most people who experienced a concussion which resolved within a year also know that their symptoms have resolved. In addition, the effort required to fill out the Questionnaire will itself serve as a deterrent for people who are

²⁵ Contreras, Jorge. “In the Village Square: Risk Misperception and Decisionmaking in the Regulation of Low-Level Radiation Waste,” *Ecology Law Quarterly*, Vol. 19, No. 3, 1992.

²⁶ Ropeik, David. “Fear vs. Radiation: The Mismatch,” *New York Times*, October 21, 2013. Accessed at http://www.nytimes.com/2013/10/22/opinion/fear-vs-radiation-the-mismatch.html?_r=0 on July 26, 2014.

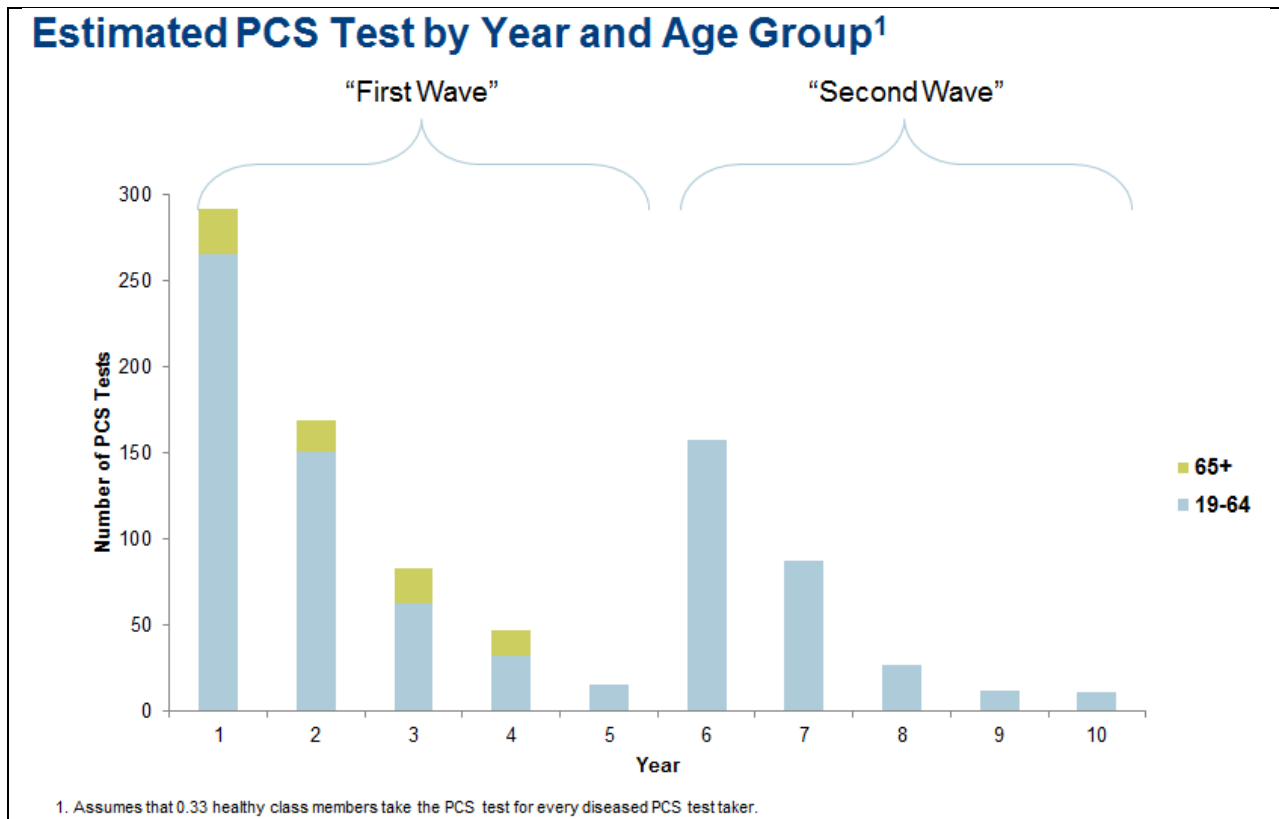
not sufficiently motivated— which will largely correlate with being diseased. Accordingly, we do not expect a large volume of Screening Questionnaires from members whose athletic and medical history do not suggest PCS. However, our scenarios conservatively assume that 90% of the Questionnaires completed will be from people who do not have PCS. We make the same assumption for CTE.

Tests

The aim of the Screening Questionnaire is to limit tests to appropriate subjects, while minimizing the number of appropriate subjects who are ruled ineligible for a test. These two goals are somewhat at odds with each other – a highly “specific” Questionnaire (i.e., one that passes for testing only very few healthy individuals) may by the same token be less “sensitive” (i.e., not pass for testing individuals who are truly diseased). Given the purpose of the Fund, it is important for the screening tool to be highly sensitive, with the result that our model assumes that some healthy individuals will qualify for testing and very few who do qualify will be screened out. The Committee believes that it is feasible to limit the proportion of non-diseased individuals tested to 25% of the total, without inappropriately sacrificing sensitivity. This reflects Dr. Cantu’s clinical experience and the Committee’s professional judgment.

The figures below show the resulting PCS and CTE tests paid for by the Fund, by year, implied by these estimates of epidemiology and take rates. As shown in Figure 6, the PCS tests are heavily front-loaded, since the relevant diseased population already exists. PCS testing is thus completed within the early years of the Fund.

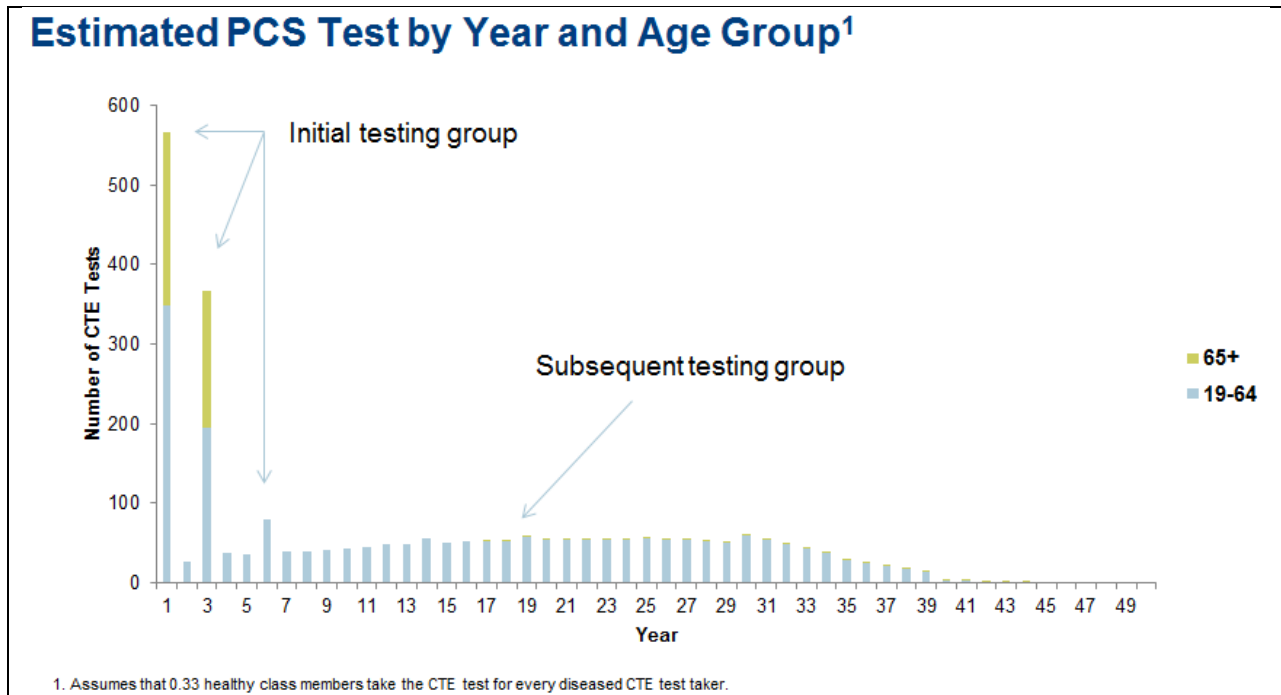
Figure 6. Estimated PCS tests by year following settlement.



For PCS testing, we anticipate a pattern of several hundred tests initially, falling off by year until the second wave of test taking. This “wave” structure reflects the 5-year latency between tests for those younger than 50 years old. More elderly test subjects complete their sequence of allowed tests more quickly, since the 50+ population are entitled to tests every 2 years.

By contrast, although there is also significant front-loading of CTE tests, test volumes continue throughout the lifetime of the Fund, as younger class members age into the age group in which CTE onset occurs and begin displaying symptoms. More than half of CTE tests are expected to occur after the 10th year of the program.

Figure 7. Estimated CTE Tests by Year Following Settlement.



In these figures, we show the effect if there is an immediate Class response to the existence of the testing program. In reality, initial testing may well be spread out somewhat over the first few years of the Fund’s existence. Since this real-life delay will reduce the initial depletion of the Fund’s resources and push costs somewhat later than modeled, it will increase the returns on its investments (while still recognizing that testing costs increase over time), and improve overall adequacy, even with no change in the total number of tests. The assumption of immediate uptake is therefore conservative, especially when considering that payment is scheduled to occur in staggered tranches over time.

Test Costs

The Committee drew upon a provisional test protocol and implied estimates of unit costs for both the PCS tests and the CTE tests developed by the Committee for the purposes of this matter. Additional information was obtained using input from the Garretson Group, who have consulted with counsel regarding the infrastructure for test provision. Dr. Cantu’s clinical expertise and relevant experience allows him to provide guidance on the nature of the testing protocol required for each test type. The testing protocol suggested by Dr. Cantu and the Class’s experts, and described generally in Ex. G to the Settlement

Agreement, is estimated to cost between approximately \$1,431 to \$1,645 for PCS tests, \$2,198 to \$2,528 for CTE tests, and \$2,477 to \$2,725 for MRI imaging, should that be needed.²⁷ These ranges are based on guidance from the Garretson group, derived from the distributions of current prices for each service. The Baseline figures represent their conservative estimates of test costs to the Fund, given these distributions; the Conservative figures reflect even higher estimates. The Committee believes that these higher estimates are very conservative, particularly since in competitive provider markets the Fund has some control over the unit test costs it will face.

Table 5. Estimates of PCS and CTE Initial Test Costs for Economic Modeling

Baseline		Conservative	
PCS Test Costs		PCS Test Costs	
Neurology Evaluation:	\$891	Neurology Evaluation:	\$1,025
Neuropsychological Evaluation:	\$540	Neuropsychological Evaluation:	\$620
Baseline PCS Total:	\$1,431	Conservative PCS Total:	\$1,645
CTE Test Costs		CTE Test Costs	
Neurology Evaluation:	\$891	Neurology Evaluation:	\$1,025
Neuropsychological Evaluation:	\$1,307	Neuropsychological Evaluation:	\$1,503
Baseline CTE Total:	\$2,198	Conservative CTE Total:	\$2,528
Baseline Magnetic Resonance Imaging Costs:	\$2,477	Conservative Magnetic Resonance Imaging Costs:	\$2,725

Table 6 shows the implied financial obligations for the Fund resulting from tests, shown at both the baseline levels of test volumes and costs and the most conservative levels of test volumes and costs.

Table 6. Baseline and Conservative Estimate of PCS and CTE Test Costs and Volume by Decade.

	Years 1-10	Years 11-20	Years 21-30	Years 31-40	Years 41-50	Total
Baseline						
PCS Test + Imaging Cost	\$2,775,075	\$0	\$0	\$0	\$0	\$2,775,075
# of PCS Tests	903	0	0	0	0	903
CTE Test + Imaging Cost	\$5,152,468	\$2,683,063	\$3,251,687	\$1,868,898	\$26,745	\$12,982,861
# of CTE Tests	1,271	515	538	292	6	2,623
Conservative						
PCS Test + Imaging Cost	\$7,808,943	\$0	\$0	\$0	\$0	\$7,808,943
# of PCS Tests	2,257	0	0	0	0	2,257
CTE Test + Imaging Cost	\$14,547,498	\$9,257,754	\$13,645,667	\$8,613,846	\$169,024	\$46,233,789
# of CTE Tests	3,178	1,288	1,345	731	15	6,557

Separately from the estimated test costs from the Garretson Group, the Committee also reviewed test cost estimates developed by the Class's medical experts, based on their clinical experience. We believe that the cost estimates are extremely conservative. As a further check, we also analyzed scenarios where test costs

²⁷ Lower bound prices are based on the 50th percentile of the Usual and Customary Rate as analyzed by the Garretson Group; upper bounds are 15% increases in PCS and CTE test costs and a 10% increase in MRI imaging costs.

would be up to 15% higher than even these conservative costs, with the Fund remaining financially adequate even under these assumptions.

Unit costs can be expected to change over time. The Committee believes that it is very likely that over the medium term to long term, unit costs for this testing will decline, particularly for the relatively expensive CTE tests. The neurological basis for CTE is such that knowledgeable parties believe that an *in-vivo* test is highly likely in the near future. Based on reviewing this literature, and with guidance from Dr. Cantu, the Committee believes that such a test is highly likely to emerge within the next 10 years. Once widely available, such a test can be expected to cost on the order of \$1,000, rather than the \$2,198 the model assumes.

Although the Baseline model assumes such *in vivo* test development, all the sensitivities assume no technological improvement. The Committee also assumes steady unit cost inflation, at historical inflation rates for medical services. Over the last 10 years, average inflation rate for medical services has been 3.7%²⁸, and this rate is used in the model. This inflation rate is conservative for medical services in general, since medical services costs cannot continue to increase faster than GDP for the long term.²⁹ For the reasons outlined above (the likely development of a much less expensive test), it is a particularly conservative inflation rate in this context.

Administrative Costs

Key components of the Medical Monitoring Program (MMP) administration costs comprise legal and professional fees, program establishment costs, notice costs, the ongoing Medical Science Committee (MSC), and costs associated with directly administering the test program (gathering and processing Screening Questionnaires, referring those eligible to test providers, and processing provider payments).

The Term Sheet stipulates legal and professional fees, which are subject to Court approval. In estimating the other administrative costs faced by the Fund, the Committee was able to draw upon a submitted proposal from Garretson to conduct the relevant administrative work. The costs involved, by category, are set out in Table 7. As a cross check, the Committee independently developed detailed estimates of resource requirements which were broadly consistent with those proposed by Garretson.

Costs not covered by the Garretson administrative proposal comprise legal and professional fees of \$15.75 million, and costs associated with the Medical Science Committee.³⁰ Estimates for these costs are also contained in Table 7 and are explained below.

²⁸ Consumer Price Index – All Urban Consumers: Medical Care. Bureau of Labor Statistics.

http://data.bls.gov/timeseries/CUUR0000SAM?output_view=pct_12mths, accessed on July 26, 2014.

²⁹ The average real annual GDP growth in the U.S. over the past 10 years of available data (2003-2012) is approximately 1.8%, a growth rate of 1.9% less than the annual medical inflation rate used in the model. “GDP growth (annual %).” The World Bank. <http://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG>, accessed on May 24, 2014.

³⁰ The Committee did not estimate the transaction costs associated with seeking subrogation from class members’ individual insurance, because the model conservatively ignores subrogation inflows. (It thus assumes that the MMP will not, on average, spend more resource seeking subrogation than it receives in return. This is clearly conservative.)

Table 7. Administrative Costs Proposed by Garretson, by Administrative Category (Baseline scenario).

Projected Cost Category	Estimate
Fixed Network Setup & Maintenance	\$2,367,479
Variable Screening & Evaluation Costs	\$305,180
Fixed Notice, Opt Outs, & Initial Calls	\$2,120,477
Variable Class Member Service Costs	\$130,053
Fixed IT Setup and Maintenance	\$1,774,034
Total:	\$6,697,224

Medical Science Committee (MSC) Costs

We assume the MSC will need to meet four times in the first year of operation, to develop the Screening Questionnaire and codify the testing protocols. We assume two meetings a year through year 30 and one meeting a year thereafter. We assume 20 billable hours' work for each of the five committee members for each meeting in year one, 15 billable hours' work through year 10 for each meeting, and 10 hours' billable work each meeting thereafter, at a rate of \$300 per hour per member (plus future inflation).

Administrative support is to be provided by the Program's Administrator.

Summary of Key Inputs and Financial Outputs

For the overall modeling of Fund adequacy, we used the inputs and sensitivity values discussed through the report. Table 8 below summarizes the key parameters.

Table 8. Summary of Primary Model Parameters.

Parameter		Model Value
Diseased population	PCS prevalence	1% of concussions after 5 years
	CTE prevalence/incidence	Based on estimates of risk of developing symptoms of cognitive impairment, relative to the general population: <ul style="list-style-type: none"> Football players: 300% relative risk Other contact sports: 150% relative risk Risk of developing cognitive impairment in the general population estimated as twice the age-stratified prevalence of dementia
	Mortality	US Vital Statistics age-specific mortality rates
Test Uptake	Take rate among those with condition	10% - 25%
	Proportion of tests given to non-diseased	Varies
Test cost	PCS test cost	\$1,431 - \$1,645
	CTE test cost	\$2,198 – 2,528
	MRI Imaging	\$2,477 – 2,725
	Inflation rate	3.7%
Admin	Fixed Network Setup & Maintenance	\$2,367,479
	Variable Screening & Evaluation Costs	\$305,180
	Fixed Notice, Opt Outs, & Initial Calls	\$2,120,477
	Variable Class Member Service Costs	\$130,053
	Fixed IT Setup and Maintenance	\$1,774,034
Fund growth	Annual return on Fund investment	3.4%

These inputs and sensitivities produce the results summarized in Table 9 below.

Table 9. Summary of Fund Adequacy Modeling.

Sensitivity Definitions					
Parameter	Baseline	Sensitivity 1	Sensitivity 2	Sensitivity 3	Sensitivity 4
Take Rate	10%	15%	15%	25%	25%
Initial Test Cost - PCS	\$1,431	\$1,431	\$1,845	\$1,431	\$1,845
Initial Test Cost – CTE	\$2,198	\$2,198	\$2,528	\$2,198	\$2,528
Initial Test Cost – Imaging	\$2,477	\$2,477	\$2,725	\$2,477	\$2,725
Test Inflation	3.7% with in vivo CTE test in 15 years	3.7%	3.7%	3.7%	3.7%

Fund Adequacy	Fund adequate by ≥ \$30M	Fund adequate by ≥ \$30M	Fund adequate by ≥ \$30M	Fund adequate	Fund adequate
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Legend	Sensitivity adjustment from Baseline
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As this Table shows, the Fund is adequate for its purpose under Baseline assumptions, and also under the various sensitivity scenarios, which use even more conservative assumptions and are labeled as Sensitivities 1 through 4.

The Committee stresses that in its view, the Baseline assumptions are inherently conservative, and that the Fund's adequacy is likely to be even greater than that forecast here in the Baseline. The same logic is, of course, true of the Sensitivity scenarios, which are included because we are aware that various parties will be quite concerned about whether the Fund adequacy will be sufficient under assumptions that are likely to be much more conservative than those reasonably expected. We believe that, given the information available, the sensitivity scenarios are sufficiently conservative to cover reasonably foreseeable situations.

Conclusions

Based on the information available, we conclude that the Fund is very likely to be adequate for its purpose of sustaining a medical monitoring program for 50 years for former NCAA student-athletes with either PCS or CTE.

Dated: July 28, 2014



Bruce F. Deal

Exhibits

Exhibit A – Bibliography

Exhibit A - Bibliography

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Exhibit A - Bibliography

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Exhibit B – Committee Member CVs

CURRICULUM VITAE

ROBERT CLARK CANTU, M.A., M.D., FACS, FAANS, FICS, FACSM

NAME: Robert Clark Cantu, MA, M.D., F.A.C.S., .F.A.A.N.S., F.I.C.S., F.A.C.S.M.
DATE OF BIRTH: August 31, 1938
BIRTHPLACE: Santa Rosa, California
PRESENT POSITIONS: Chief, Neurosurgery Service, Chairman Department of Surgery
 Director, Service of Sports Medicine
Emerson Hospital, Concord, MA 01742
 Telephone: 1-978-369-1386
 Facsimile: 1-978-287-0047

Clinical Professor Neurology and Neurosurgery, Boston University School of Medicine, Co-Founder Center for The Study of Traumatic Encephalopathy (CSTE), Boston University Medical Center, Boston, MA

Senior Advisor to NFL's Head, Neck and Spine Committee

Member/Co-Chair Equipment and Rules Committee NFLPA Mackey/White TBI Committee

Adjunct Staff Department Neurosurgery, Senior Advisor Brain Injury Center Children's Hospital Boston, Boston, MA

Adjunct Professor, Exercise and Sport Science, University North Carolina, Chapel Hill, NC

Medical Director, National Center for Catastrophic Sports Injury Research, Chapel Hill, NC

Clinical Instructor in Pediatrics, Boston University School of Medicine

Neurosurgical Consultant Boston College Eagles football team

Co-Director, Neurologic Sports Injury Center at Brigham and Women's Hospital, Boston, MA

Founding Member and Chairman Medical Advisory Board Sports Legacy Institute (SLI), Waltham, MA

EDUCATION:

1960	B.A.	University of California, Berkeley
1962	M.A.	University of California, San Francisco
1963	M.D.	University of California, San Francisco

PROFESSIONAL EXPERIENCE:

1963 - 1964	Intern in Surgery, Columbia-Presbyterian Hospital, New York, NY
1964 - 1967	Assistant Resident in Neurosurgery, Massachusetts General Hospital
1964 - 1967	Research Fellow in Physiology, Harvard Medical School
1967 - 1968	Chief Resident in Neurosurgery, Boston City Hospital
1967 - 1968	Teaching Fellow in Surgery, Harvard Medical School
1967 - 1968	Clinical Assistant in Neurosurgery, Massachusetts General Hospital
1968 - 1973	Clinical and Research Fellow in Neurosurgery, Massachusetts General Hospital
1968 - 1969	Assistant in Surgery, Harvard Medical School
1969 - 1973	Instructor in Surgery, Harvard Medical School
1968 - 1970	Acting Assistant Director Neurosurgery, Boston City Hospital
1968 - 1970	Director of Pediatric Neurosurgery, Boston City Hospital
1968 - 1973	Clinical Associate in Neurosurgery, Massachusetts General Hospital
1968 -	Chief of Neurosurgery Service, Emerson Hospital, Concord, MA
1970 - 1995	Neurosurgical Consultant, Cutler Army Hospital, Fort Devens, MA
1970 - 1975	Neurosurgical Consultant, Nashoba Community Hospital, Ayer, MA
1976 - 1978	Chief of Neurosurgery Service, Nashoba Community Hospital, Ayer, MA
1979 - 1980	Chairman, Department of Surgery, Emerson Hospital, Concord, MA
1980 -	Director, Service of Sports Medicine, Emerson Hospital, Concord, MA
1989 - 1991	Chairman, Department of Surgery, Emerson Hospital, Concord, MA
1989 -	Medical Director, National Center for Catastrophic Sports Injury Research
1991 - 1993	Board of Trustees, Emerson Hospital, Concord, MA
1991 - 1993	Director, Emerson Health System, Inc.
1992 - 1993	President, American College of Sports Medicine
1994 -	Clinical Instructor in Pediatrics, Boston University School of Medicine

1994 - **Board of Trustees**, National Operating Committee on Standards For Athletic Equipment (NOCSAE)

1996 - **Vice-President**, National Operating Committee on Standards for Athletic Equipment (NOCSAE)

1994 - **Board of Advisors**, National Youth Sports Foundation for the Prevention of Athletic Injuries, Inc.

1998 - 2000 **Scientific Advisory Panel on Sports Medicine**, Knoll Pharmaceutical Company

1998 - 2000 **Advisory Committee for Injury Prevention**, Centers For Disease Control, Atlanta, GA

2000 - **Executive Committee Joint Section on Neurotrauma**,
Congress Neurological Surgeons/American Association Neurological Surgeons

2002 - 2005 **Editorial Board**, Journal of Athletic Training

2001 - **Co-Chairman**, NASCAR Safety Task Force, American College Sports Medicine, Indianapolis, IN

2002 - **Editorial Board**, Current Sports Medicine Reports

2002 - **Editorial Board**, American Journal of Medicine & Sports

2002 - **Neurosurgical Consultant**, Boston College Eagles football team

2003-2010 **Neurosurgical Consultant**, Boston Cannons professional Lacrosse team

2003 - **Editorial Board Principal Sports**, *Neurosurgery*

2003- **Adjunct Appointment**, Brigham and Women's Hospital, Boston, MA

2004-2010 **Chairman**, Department of Surgery, Emerson Hospital Concord, MA

2005- **Board of Directors**, Massachusetts Brain Injury Association, Westborough, MA

2007- **Medical Advisory Board of the State Boxing Commission**, Boston, MA

2007 - **Founding Member and Chairman Medical Advisory Board Sports Legacy Institute (SLI)**,
Waltham, MA

2007 - **Clinical Professor Neurosurgery**, Boston University School of Medicine, Boston, MA

2009 -2013 **Co-Director Center for The Study of Traumatic Encephalopathy (CSTE)**, Boston University
Medical Center, Boston, MA

2014- **Co-Founder Center for The Study of Traumatic Encephalopathy (CSTE)**, Boston University
Medical Center, Boston, MA

2010 - **Senior Advisor to NFL's Head, Neck and Spine Committee**

2010- **Fellow of the American Association of Neurological Surgeons (FAANS)**

2010 - **Member/Co-Chair Equipment and Rules Committee**, NFLPA Mackey/White TBI Committee

2010- **Fellow American Association Neurological Surgeons**

2012 - **Adjunct Staff Department Neurosurgery**, Senior Advisor Brain Injury Center Children's
Hospital Boston, Boston, MA

2014 - **International Rugby Board Advisory Group – United Kingdom**

2014- **Co-Founder Center for The Study of Traumatic Encephalopathy (CSTE)**, Boston University
Medical Center, Boston, MA

SERVICE TO PROFESSIONAL SOCIETIES

NATIONAL SOCIETIES:

American College of Sports Medicine	1978 -
Board of Trustees	1984 - 1994
	1996 - 1999
Ambassador	1988 –
President-elect:	American College of Sports Medicine, 1991 - 1992
President:	American College of Sports Medicine, 1992 - 1993
Treasurer:	American College of Sports Medicine, 1996 – 1999
Associate Editor:	<u>Medicine and Science in Sports and Exercise</u> , 1986 - 1998
Associate Editor:	<u>Exercise and Sports Science Reviews</u> , 1986 - 2000
Editorial Board:	<u>The Physician and Sportsmedicine</u> , 1989 -
Editorial Board:	<u>Clinical Journal of Sports Medicine</u> , 1991 -
Editorial Board:	<u>Journal Athletic Training</u> , 2000 – 2005

Editorial Board: Neurosurgery: Sports Section

2003 –

American Association of Neurological Surgeons

Chairman, Sports Medicine Section, 1985 – 1988

American Medical Tennis Association

Board of Directors, 1984 – 1987

REGIONAL SOCIETIES:

New England Chapter, American College of Sports Medicine

Executive Committee: 1980 - 1982

President: 1981 - 1982

Board of Trustees: 1982 - (**Chairman**, 1983)

PROFESSIONAL CONSULTANT:

1983 - 1985 Advisory editor in sports medicine to The Collamore Press, Lexington, MA
 1984 - Technical advisor, Milner-Fenwick Company, Baltimore, MD
 1985 - Consultant, United States of America Amateur Boxing Federation, Inc.
 1986 - Consultant, Exercycle Corporation, Woonsocket, RI
 1986 - 1988 Consultant, Reebok Corporation, Avon, MA
 1988 - 1990 Consultant, Nautilus Company, Independence, VA
 1994 - Athletic Advisory Board, Hartwell Medical
 1994 - 2000 Consultant, NordicTrack, Chaska, MN
 1998 - 2000 Scientific Advisory Panel on Sports Medicine. Knoll Pharmaceutical Co.
 2000- Executive Committee Joint Section on Neurotrauma, Congress Neurological Surgeons/American Association Neurological Surgeons
 2002-2005 Editorial Board, Journal of Athletic Training
 2002- Neurosurgical Consultant to Boston College Eagles football team
 2003-2010 Neurosurgical Consultant to Boston Cannons professional Lacrosse team
 2003 Principal – Sports Section, *Neurosurgery*
 2003- NOCSAE Consultant to the NFL Concussion Committee
 2004- Board of Directors, Massachusetts Brain Injury Association, Westborough, MA
 2007- Medical Advisory Board of the State Boxing Commission, Massachusetts
 2007 - Founding Member and Chairman Medical Advisory Board Sports Legacy Institute, Waltham, MA
 2014 - International Rugby Board Advisory Board – United Kingdom

FELLOWSHIPS:

1975 **Fellow**, American College of Surgeons
 1981 **Fellow**, International College of Surgeons
 1981 **Fellow**, American College of Sports Medicine
 2010 **Fellow**, American Association Neurological Surgeons (FAANS)

HONORS AND AWARDS:

California Scholastic Federation Award
 Kraft Award (top twenty freshmen), University of California, Berkeley, 1956-57
 Borden Research Award, 1963
 Microcirculatory Travel Award, 1963
 Candidate Group Prize, Massachusetts Chapter, American College of Surgeons, 1969
 Honor Award in Medicine, New England Chapter, American College of Sports Medicine, 1987
 Distinguished Service Award, American Association for the Improvement of Boxing, 1991
 Rocky Marciano Medical Award, American Association for the Improvement of Boxing, 1995

Citation Award, American College of Sports Medicine, 1996
Special Citation Award, New England Chapter, American College Sports Medicine, 2002
Educator of the Year Award from the American Association of Professional Ringside Physicians 2004
Dr. Ernst Jokl Sports Medicine Award 2010 from The United States Sports Academy 2010
Community Clinician of the Year 2013 from The Middlesex Central District Medical Society and The Massachusetts Medical Society
ETHOS Award, Institute for Sports Law and Ethics, University of Santa Clara 2014

LICENSES TO PRACTICE MEDICINE:

By written examination in California, 1963 #: 21223
By written examination in Massachusetts, 1964 #: 28386

SPECIALTY BOARD CERTIFICATION:

American Board of Neurological Surgery, 1970

MEMBERSHIPS:

Social Fraternities: Phi Kappa Psi
 Nu Sigma Nu (President, Phi Chapter, 1962-1963)
Scholastic Fraternities California Scholastic Federation
 Tower and Flame
 Phi Eta Sigma
 Phi Beta Kappa (junior year)
 Alpha Omega Alpha

PROFESSIONAL SOCIETIES:

American Academy of Sports Physicians
American Association for the Advancement of Science
American Association for the Improvement of Boxing
American Association of Neurological Surgeons
American Association of Professional Ringside Physicians
American Association for the History of Medicine
American College of Angiography
American College of Sports Medicine
American College of Surgeons
American Federation of Clinical Research
American Heart Association
American Medical Association
American Physiology Society
American Society for Pharmacology and Experimental Biology
California (Medical) Alumni Society
Congress of Neurological Surgeons
International College of Surgeons
International Society for Pediatric Neurosurgery
Massachusetts Medical Benevolent Society
Massachusetts Medical Society
Microcirculatory Society
New England Neurosurgical Society
North American Spine Society
Presbyterian Hospital Alumni Society
Society of Military Surgeons
Society of Neuroscience

BACKGROUND SUMMARY

Currently Dr. Cantu's professional responsibilities include those of Clinical Professor of Neurology and Neurosurgery and Co-Director [Center for the Study of Traumatic Encephalopathy, Boston University School of Medicine](#), Boston, MA; Founding member and Medical Director [Sports Legacy Institute](#), Waltham, MA; Adjunct Professor Exercise and Sport Science and Medical Director [National Center for Catastrophic Sports Injury Research, University of North Carolina](#), Chapel Hill, NC; Co-Director, [Neurologic Sports Injury Center, Brigham and Women's Hospital](#), Adjunct Staff Department Neurosurgery and Senior Advisor Brain Injury Center [Children's Hospital Boston](#), Boston, MA; Boston, Chief of Neurosurgery Service, Associate Chairman Department of Surgery, and Director of Sports Medicine at [Emerson Hospital](#) in Concord, Massachusetts, Neurosurgical Consultant Boston Eagles football team. He has authored over 392 scientific publications, including 31 books on neurology and sports medicine, in addition to numerous book chapters, peer-reviewed papers, abstracts and free communications, and educational videos. He has served as associate editor of [Medicine and Science in Sports and Exercise](#) and [Exercise and Sports Science Review](#), and on the editorial board of [The Physician and Sports Medicine](#), [Clinical Journal of Sports Medicine](#), and [Journal of Athletic Training](#). In 2003 Dr. Cantu became the section head for the Sports Medicine Section of *Neurosurgery*.

He grew up in the northern California community of Santa Rosa. In 1960, he received his B.A. degree from the University of California Berkley where he pitched on the varsity baseball team. Jointly, in medical school and graduate school, he received his M.A. degree in endocrinology in 1962, and in 1963, his M.D. from the University of California Medical School in San Francisco. Following a surgical internship at Columbia-Presbyterian Hospital in New York City in 1963-1964, he began a neurosurgery residency at Massachusetts General Hospital in Boston, and simultaneous position of research fellow in physiology at Harvard Medical School. Upon completion of his residency in 1968, he joined the neurosurgery staff at MGH, where his practice and laboratory were located, while assuming the position of acting assistant director of neurosurgery and director of pediatric neurosurgery at Boston City Hospital. After five years of academic neurosurgery with Harvard Hospitals, Dr. Cantu entered private neurosurgery practice at the suburban Emerson Hospital in Concord, Massachusetts where he currently serves as Chairman Department of Surgery, Chief Neurosurgical Service and Director Service of Sports Medicine.

In addition to his professional responsibilities, Dr. Cantu is medical director of the [National Center for Catastrophic Sports Injury Research, located in Chapel Hill, North Carolina](#), an ongoing registry instituted in 1982 for data collection and analysis of spine and head injuries. From this data important contributions have been made in sport safety and accident reduction; most notably football rule changes concerning tackling and blocking with the head, the establishment of football helmet standards, improved on-the-field medical care, and coaching techniques. He also serves on the Board of Trustees as Vice President and chairman of scientific committee of [NOCSAE](#) (National Operating Committee on Standards for Athletic Equipment).

Dr. Cantu also is Co-Director of the Neurological Sports Injury Center at Brigham and Women's Hospital in Boston, MA.

For many years, Dr. Cantu has been actively involved with the American College of Sports Medicine (ACSM), the oldest and largest sports medicine and exercise science organization in the world, and served as President of this organization from 1992 to 1993 and served as treasurer from 1996 to 1999. Dr. Cantu has received recognition from the college being named as the recipient of their Citation Award in 1996. This year Dr. Cantu gave the organizations most prestigious J.B. Dill Lecture on the History of Concussions at ACSM's annual meeting in New Orleans.

As spokesperson for ACSM, he has participated in nationally televised sports programs speaking on diverse sports issues and has appeared on "Larry King Live" discussing the Chris Benoit case in conjunction with Chris' father Michael Benoit, "ESPN Outside the Lines" discussing the Chris Benoit case, Canadian Television also discussing the Chris Benoit case as well as other media avenues, "NFL Today" with Bryant Gumbel and Terry Bradshaw, discussing the effect of artificial turf on cervical spine injuries, and football injuries on CNBC's "The Real Story". He has been interviewed for World News Tonight with Peter Jennings, CBS Evening News with Katie Couric, Dan Rather, and NBC Evening News with Brian Williams regarding gender and concussion incidence. He has been a spokesperson for ACSM on NASCAR deaths and safety issues surrounding NASCAR and has been interviewed for "World News Tonight" with Peter Jennings regarding NASCAR deaths and specifically Dale Earnhardt's death as well as safety issues in auto racing. Dr. Cantu also appeared on "ABC World News Tonight" with Bob Jamison regarding the Korey Stringer death from heat stroke as well as WGBH Channel 2 in Boston, NPR radio interview, WEEI Boston radio interview and ESPN's "Outside the Lines", all discussing the issue of heat stroke. He has discussed the health issues of football players with Mary Carillo on HBO's Inside the NFL and has done an interview regarding sports related injuries in cheerleading on Inside the NFL. Dr. Cantu has also been interviewed by Bob Costas on HBO's Inside the NFL regarding Concussion in Professional Sports and was the key speaker on Designer Steroids for Comcast Cable Network. Dr. Cantu is currently serving as the Consultant for NOCSAE to the NFL Concussion

Committee and Co-Chairman for the NASCAR Safety Task Force with ACSM. Dr. Cantu has done safety presentations for drivers and teams of CART as well as NASCAR. Dr. Cantu has been interviewed by ESPN Outside the Lines Tom Friend regarding Baby Joe Mesi and his return to boxing after a controversial subdural hematoma. Dr. Cantu continues to be an outspoken advocate for the sport of boxing and continues to advocate for the safety of that sport and its participants. Recently Dr. Cantu has done several interviews on Concussion in the NFL with ESPN, HBO and the Boston area news channels. Dr. Cantu has recently been involved with the NFL meeting in NYC regarding concussions and guidelines for concussions with Roger Goodell. Most recently Dr. Cantu has appeared on Brian Williams Rock Center with Kate Snow discussing concussion issues.

As an author of numerous books as well as articles on sports medicine topics, he is frequently invited to participate in symposiums addressing a wide range of sports medicine topics including anabolic steroid use; eating disorders in female athletes; acute and chronic brain injury in boxing; and on-the-field evaluation and medical management and return to play guidelines following head and spine sports injuries. *Dr. Cantu's most recent book "Concussion and Our Kids" was released September 19, 2012 from Houghton Mifflin Harcourt.*

He has served as a consultant to many scholastic and professional athletes on the return to collision sports after a head injury or spine injury, and is active speaking on a variety of health-related interests including the overall benefits of moderate regular exercise; the special health and exercise concerns of senior citizens; and sports safety issues with high school athletic trainers, coaches, students and parents. He currently serves as the Neurosurgical consultant to the Boston College Eagles Football team and served as the Neurosurgical consultant to the Boston Cannons professional Lacrosse team from 2003 to 2010. He recently was asked by the NFL Commissioner Roger Goodell to give two presentations at the NFL's concussion meeting in Chicago.

Practicing what he preaches, Dr. Cantu has enjoyed long-distance running since 1967. An official entrant in many Boston Marathons, he has also enjoyed the "long runs" at Newport and New York City,. Besides running, Dr. Cantu is a serious tennis player, for many years ranked in the men's senior singles in New England (NELTA) region. Dr. Cantu has two children, Rob and Elizabeth and a grandchild Jeremy and lives with his wife Tina in Lincoln, Massachusetts.

PUBLICATIONS: 392

BOOK CHAPTERS	90
REFEREED ARTICLES	176
BOOKS	32
NON-REFEREED ARTICLES	46
ABSTRACTS AND FREE COMMUNICATIONS	29
SPORTS MEDICINE EDUCATIONAL VIDEOS	15
IN PRESS	4

BOOK CHAPTERS

1. **Cantu RC**: The treatment and prevention of athletic low back injuries, in Vinger FP, Hoerner EF (ed): Sports Injuries: the Unthwarted Epidemic, Littleton, PSG Publishing, Inc, 1980.
2. **Cantu RC**: Nutrition and endurance exercise: Facts, myths, speculations, in **Cantu RC** (ed): Health Maintenance Through Physical Conditioning, Littleton, Wright-PSG Publishing, Inc, 1981.
3. **Cantu RC**: The prevention of athletic head and spine injuries, in **Cantu RC** (ed): Health Maintenance Through Physical Conditioning, Littleton, Wright-PSG Publishing, Inc, 1981.
4. **Cantu RC**, Day RG: Corporate fitness centers, in **Cantu RC** (ed): The Exercising Adult, Lexington, The Collamore Press, D.C. Heath & Co, 1981.
5. **Cantu RC**: Head and cervical spine injuries, in **Cantu RC** (ed): The Exercising Adult, Lexington, The Collamore Press, D.C. Heath & Co, 1981.
6. **Cantu RC**: Lumbar spine injuries, in **Cantu RC** (ed): The Exercising Adult, Lexington, The Collamore Press, D.C. Heath & Co, 1981.
7. **Cantu RC**: Conditioning the cardiovascular system, in **Cantu RC** (ed): Sports Medicine in Primary Care, Lexington, The Collamore Press, D.C. Heath & Co, 1982.
8. **Cantu RC**: Nutrition for sports, in **Cantu RC** (ed): Sports Medicine in Primary Care, Lexington, The Collamore Press, D.C. Heath & Co, 1982.
9. **Cantu RC**: Exercise and life-style modifications in primary care practice, in **Cantu RC** (ed): Sports Medicine in Primary Care, Lexington, The Collamore Press, D.C. Heath & Co, 1982.
10. **Cantu RC**: Writing a precise aerobic exercise prescription, in **Cantu RC** (ed): Sports Medicine in Primary Care, Lexington, The Collamore Press, D.C. Heath & Co, 1982.
11. **Cantu RC**: Sports injuries in young athletes, in **Cantu RC** (ed): Sports Medicine in Primary Care, Lexington, The Collamore Press, D.C. Heath & Co, 1982.
12. **Cantu RC**: The sports medicine bag of the primary care team physician, in **Cantu RC** (ed): Sports Medicine in Primary Care, Lexington, The Collamore Press, D.C. Heath & Co, 1982.
13. **Cantu RC**: Head and neck injuries, in **Cantu RC** (ed): Sports Medicine in Primary Care, Lexington, The Collamore Press, D.C. Heath & Co, 1982.
14. **Cantu RC**: Lumbar spine injuries, in **Cantu RC** (ed): Sports Medicine in Primary Care, Lexington, The Collamore Press, D.C. Heath & Co, 1982.
15. **Cantu RC**: Torso and genitourinary tract injuries, in **Cantu RC** (ed): Sports Medicine in Primary Care, Lexington, The Collamore Press, D.C. Heath & Co, 1982.
16. **Cantu RC**: Upper extremity injuries, in **Cantu RC** (ed): Sports Medicine in Primary Care, Lexington, The Collamore Press, D.C. Heath & Co, 1982.
17. **Cantu RC**: Sports and the handicapped child, in Micheli LJ (ed): Sports Injuries in the Child and Adolescent, Boston, Little Brown & Co, 1982.
18. **Cantu RC**: Techniques of spinal fusion, in Schmidek HH, Sweet W (ed): Current Techniques in Operative Neurosurgery, Orlando, Grune & Stratton, Inc, 1982.

19. **Cantu RC**: Epidemiology, biomechanics, and diagnoses of head and cervical spine injuries, in **Cantu RC** (ed): Sports Medicine-Sports Science: Bridging the Gap, Lexington, The Collamore Press, D.C. Heath & Co, 1982.
20. **Cantu RC**: Intracranial injuries, in Butler RB, Moore MJ, **Cantu RC** (ed): Neurology in Primary Care, New York, MacMillan Publishing Co, 1985.
21. **Cantu RC**: Cervical, thoracic and lumbar spine injuries, in Butler RB, Moore MJ, **Cantu RC** (ed): Neurology in Primary Care, New York, MacMillan Publishing Co, 1985.
22. **Cantu RC**: Intervertebral disc disease: Acute rupture, spondylosis and spinal stenosis, in Bulter RB, Moore MJ, **Cantu RC** (ed): Neurology in Primary Care, New York, MacMillan Publishing Co, 1985.
23. **Cantu RC**: Head and spine injuries in the young athlete, in Micheli LJ (ed): Clinics in Sports Medicine: Injuries in the Young Athlete, Philadelphia, W.B. Saunders Co, 1988.
24. **Cantu RC**: Techniques of fusion in the cervical, thoracic, and lumbar spine, in Schmidek HH, Sweet WH (ed): Operative Neurosurgical Techniques: Indications, Methods and Results, ed 2. Orlando, Grune & Stratton, Inc, 1988.
25. **Cantu RC**: Head injury in sports, in Grana WA, Lombardo JA (ed): Advances in Sports Medicine and Fitness, vol 2. Chicago, Year Book Medical Publishers, 1989.
26. **Cantu RC**: Head and neck injuries, in Mueller FO, Ryan A (ed): The Sports Medicine Team and Athletic Injury Prevention, Philadelphia, F.A. Davis Co, 1990.
27. **Cantu RC**: Osseous fusion of the cervical, thoracic, and lumbar spine with primary and metastatic spine tumors, in Schmidek HH, Schiller AL, Rosenthal DI, Sundaresan N (ed): Tumors of the Spine: Diagnosis and Clinical Management, Philadelphia, W.B. Saunders Company, 1990.
28. **Cantu RC**: Criteria for return to competition following a closed head injury, in Torg JS (ed): Athletic Injuries to the Head, Neck, and Face, ed 2. Chicago, Year Book Medical Publishers, 1991.
29. **Cantu RC**: Position statement of the American Medical Association on boxing: Analysis and perspective, in Torg JS (ed): Athletic Injuries to the Head, Neck, and Face, ed 2. Chicago, Year Book Medical Publishers, 1991.
30. **Cantu RC**: The nervous system, in Strauss RH (ed): Sports Medicine, ed 2. Philadelphia, W.B. Saunders Co, 1991.
31. **Cantu RC**: Minor head injuries in sports, in Dymont PG (ed): Adolescent Medicine: State of the Art Reviews, 2(1). Philadelphia, Hanley & Belfus, Inc, 1991.
32. Mueller FO, **Cantu RC**: The annual survey of catastrophic football injuries: 1977-1988, in Holloszy JO (ed): Exercise and Sport Sciences Reviews, vol 19. Baltimore, Williams & Wilkins, 1991.
33. **Cantu RC**: Transportation/immobilization: Criteria for return to competition after head or cervical spine injury, in **Cantu RC**, Micheli LJ (ed): American College of Sports Medicine: Guidelines for the Team Physician, Philadelphia, Lea & Febiger, 1991.
34. Young JE, **Cantu RC**: Life-threatening emergencies, in **Cantu RC**, Micheli LJ (ed): American College of Sports Medicine: Guidelines for the Team Physician, Philadelphia, Lea & Febiger, 1991.
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10. **Cantu RC**: Heart failure: A limiting factor in recovery from cerebral ischemia. Circulation 1968; 38, suppl VI:51.
11. **Cantu RC**, Ames A III: Distribution of cerebral vascular obstruction following ischemia. Circulation 1968; 38, suppl VI:51.
12. DiGiacinto G, **Cantu RC**, Ames A III, Dixon J: Hypotension: A limiting factor in recovery from cerebral ischemia. Clin Res 1968; 16:512.
13. Dixon J., **Cantu RC**, Ames A III, DiGiacinto G: Effect of heparin on vascular lesions caused by cerebral ischemia. Clin Res 1968; 16:513.
14. **Cantu RC**, DiGiacinto G, Dixon J, Ames A III: Reversibility of post-ischemic cerebrovascular obstruction. Clin Res 1969; 17:233.
15. DiGiacinto G, **Cantu RC**, Ames A III: Effects of hypertension on post-ischemic cerebrovascular obstruction. Clin Res 1969; 17:237.
16. **Cantu RC**, Snyder M: Effect of pharmacological agents on post-ischemic cerebrovascular obstruction. Fed Proc 1970; 29:520.
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18. **Cantu RC**: Acute and chronic brain injury and contact sports. 1987; ACSM Clinical Conference, Keystone, CO.
19. **Cantu RC**: Concussion - what is it? Guidelines for returning to sports. 1987; ACSM Clinical Conference, Keystone, CO.

20. **Cantu RC**: Discogenic disease: surgical and non-surgical approaches. 1987; ACSM Clinical Conference, Keystone, CO.
21. **Cantu RC**: Medical aspects of boxing. 1987; ACSM Clinical Conference, Keystone, Co.
22. **Cantu RC**: Catastrophic Football Spine Injuries: 1977-1988. Joint Section on Disorders of the Spine and Peripheral Nerves 1990; AANS/CNS Annual Meeting, Captiva Island, FL.
23. Cunningham LM, **Cantu RC**: Is exercise intensity generalizable? Comparison of exercise test modes. MSSE 1990; 22:13.
24. Van Camp SP, Mueller FO, **Cantu RC**, Nattiv A, Eichner ER: Catastrophic sports injuries in high school and college athletes. MSSE 1994; 26:S86.
25. Mueller FO, **Cantu RC**: High school and college catastrophic pole vaulting injuries. MSSE 1995; 27:598.
26. Ross SE, Guskiewicz KW, **Cantu RC**: Balance recovery following cerebral concussion in collegiate athletes. ACSM Clinical Conference, Baltimore, MD MSSE 2001; 33:S145.
27. Guskiewicz KM, **Cantu RC**, Mueller FO, Barth, JT: Management of sports related concussion: New insights into an old problem. ACSM Clinical Conference, Baltimore, MD MSSE 2001; 33:S144.
28. Guskiewicz KM, Marshall SW, Broglio SP, **Cantu RC**, Kirkendall DT: No evidence of impaired neurocognitive performance in collegiate soccer players. ACSM Clinical Conference, Baltimore, MD MSSE 2001; 33:S186.
29. Mihalik JP, Guskiewicz KM, Marshall SW, **Cantu RC**, Blackburn JT, Greenwald RM. Effect of General On-Ice Aerobic Fitness on Head Impact Biomechanics in Youth Hockey Players. MSSE 2010

SPORTS MEDICINE EDUCATIONAL VIDEOS

- Diabetes and Exercise
Cantu, RC.
Milner-Fenwick Company; 1984
- Sports Medicine and the Primary Care Physician
Cantu RC, Siegel AJ, Childs HD.
Network for Continuing Medical Education; 1990

The preschool-sports physical, life-style modification in the well patient; special emphasis given to assisting physicians to help patients make life-style changes necessary to reap the benefits of regular physical activity.
- ACSM's Guidelines for the Team Physician
Cantu RC, Herring SA, Kibler WB, Micheli LJ, Puffer JC.
Williams & Wilkins Electronic Media; 1992

Cantu RC: "Athletic Head and Neck Injury"

• ACSM: 39th Annual Meeting
Cantu RC, Jordan BD, Sennett BJ, Micheli LJ, Hainline B.
CME Conference Video, Inc.; 1992

Cantu RC, Jordan BD: "Sports Neurology"

• ACSM Sports Medicine CAQ Review
Cantu RC, Stoller D, Saal J, Smith AD, Shoor S.
CME Conference Video, Inc.; 1993

Cantu RC: "Functional Anatomy & Biomechanics: Exam of the Patient with Low-Back Pain"

Cantu RC: "Lumbar spinal stenosis: Dx and Management"

Cantu RC "Indications for Surgery and Return to Competition After Lumbar Spine Injury"

Cantu RC: "Legal Aspects of Sports Medicine and Role of the Team Physician"

Cantu RC: "Epidemiology, Recognition, and Acute Management of Closed Head Injury/Concussion"

Cantu RC: "Return to Competition After Head Injury"

Cantu RC: "Fractures and Dislocations of Cervical Spine"

Cantu RC: "Epidemiology, Evaluation, and Treatment of Traumatic Spinal Cord Injury: Return to Competition"

Cantu RC: "Case Presentations: Transient Quadriplegia"

• ACSM/Wyeth Ayerst Laboratories
Spellbound Productions; 1994

Cantu RC: "Cervical Spine Injuries"

Cantu R, Torg J et al: "Catastrophic Head and Spine Injuries in Football"
NATA

IN PRESS

1. Terell, T et al
2. Picano J, **Cantu RC** et al. Defining Concussion: An Emperical Analysis of Concussion Reporting Using a Specific Definition of Concussion. *Clin J Sports Med* (submitted)
3. Cantu RV, **Cantu RC**. Cervical Spine chapter for Lyle Micheli due October
4. Chapter on “Concussion” *Head Trauma and Brain Injury*.

RECENT LECTURE PRESENTATIONS

- 8.13.14 Western University
“Sport Safety and Accident Reduction, Including The Establishment of Helmet Standards”
“Treatment Outcomes, Signs and Symptoms and Contemporary Treatment Strategies”
London, ON, Canada
- 7.31.14 #C4CT Concussion Awareness Summit
“Current State of Sport Concussion”
United Nations Headquarters
NYC, NY
- 7.18.14 Third Annual Western Slope Sports Medicine Clinical Symposium
“Concussion Management – Yesterday, Today, Tomorrow”
Grand Junction, CO
- 7.15.14 Hit Count Meeting
- 6.20.14 NOCSAE Summer Meeting
Boston, MA
- 6.5.14 Concord Rotary Club
“Why Youth Are At Increased Risk of Concussion”
Concord, MA
- 5.29.14 White House Concussion Summit
Washington, DC
- 5.23.14 11th Annual Sports Conference
“Practice Like Pros”
Martin Conference Center
Harvard Medical School
Boston, MA
- 5.16.14 9th Annual Brain Injury Rehabilitation Conference
“Update on Chronic Traumatic Encephalopathy”
“Management of Concussion in Student Athletes”
Liberty Station conference Center
San Diego, CA
- 5.8.14 New England Youth Concussion forum
“Concussion Past, Present, Future”
Gillette
Foxboro, MA
- 4.26.14 2014 Sports Sciences Symposium
“Concussions: The Current Concussion Lessons We Have Learned”
Hilton Orlando at Lake Buena Vista Hotel
Orlando, FL
- 4.6.14 AMSSM
“Neurological Assessment and Concussion Management”
“Breaking Backbones: Diagnosis and Management of Spinal Fractures in Athletes”
Hyatt Regency New Orleans
New Orleans, LA

3.29.14	ARP Mid Term Board Meeting Miami, FL
3.21.14	Mackey White TBI Committee Meeting Waldorf Astoria, Orlando Orlando, FL
3.17.14	Brain Injury Association of South Carolina “Short Term and Long Term Results of Repetitive Sub-Concussive and Concussive Head Injury” Columbia, SC
2.27.14	Press Conference “House Bill 5113, An Act Concerning Youth Athletics and Concussion” Hartford, CT
1.29.14	C4CT Concussion Awareness Summit “Long Term Consequences of Repetitive Brain Trauma: CTE and Neurodegeneration” United Nations NYC, NY
1.23.14-1.24.14	5 th Annual USA Rugby sports Medicine Symposium “Short Term and Long Term Results of Repetitive Sub-Concussive and Concussive Head Injury” Las Vegas, NV
1.17.14	NOCSAE Winter Board Meeting 2014 SAC Presentation Royal Palms Phoenix, AZ
1.9.14	NASCAR Meeting John Bobo, Steve O'Donnell, Jim Cassidy, Thomas Gideon, P.E., John Patalak, P.E. Daytona, FL
12.14.13	Beth Israel Deaconess Hospital “Risks for and Management of Patients with Concussions” Dedham Holiday Inn Dedham, MA
12.13.13	NCCSIR Chapel Hill, NC
11.25.13	Safe Sports Think Tank: Exploring the relationship between childhood sports-related concussions and long-term cognitive outcomes “What Should Parents Know About Short and Long-Term effect of Concussions, and Should Parents Limit Sports Activities For Children Who Have Suffered Multiple Concussions” Washington, DC
11.14.13	Press Conference Legislative Office Building Albany, NY
10.25.13	Boston Sports Medicine Symposium 2013 “How to Reduce the Risk of Concussions and CTE in Collision Sports”

Waltham Woods conference Center
Waltham, MA

10.24.13 ARP Annual conference
“Relationships Between CTE and Concussive Exposure in Contact Sports”
Symposium: Concussion and Action Points
VDARA Hotel & Spa
Las Vegas, NV

10.16.13 Annual Emerson Hospital Auxiliary
“The Concussion Crisis: Where Are We Today?”
Nashawtuc Country Club
Concord, MA

10.4.13 Reading Hospital
Grand Rounds
“Concussion Crisis in Youth Sports”
Thun/Janseen Auditorium
West Reading, PA

9.26.13 Belmont Hill School
“Concussion Update”
Belmont, MA

9.17.13 Emerson Hospital Cooperator Dinner
“The Concussion Crisis in 2013”
Emerson Hospital
Concord, MA

9.12.13 Fourth Annual Sports Law & Ethics Symposium
Santa Clara, CA

8.18.13 LA84 Foundation
“The Concussion Crisis in Youth Sports”
Los Angeles, CA

8.10.13 Massachusetts Coaches’ Association
“Practice Like Pro’s”
Worcester, MA

7.13.13 AOSSM 2013 Annual Meeting
Sheraton Chicago Hotel & Towers
Chicago, IL

6.28.13 NOCSAE Summer Board Meeting
Fairmont Olympic Hotel
Seattle, WA

5.17.13 10th Annual Sports-Related Conference on Concussion and Spine Injury
“Cervicogenic Headache, Upper Cervical Spine”
Martin conference Center at Harvard Medical School
Boston, MA

4.24.13 Mackey-White TBI Committee Meeting
Westin Grand Central
New York, NY

4.11.13	New England Patriots Alumni Club, Inc. CBS Scene, Patriots Place Foxboro, MA
4.10.13	SLI Reception Boston Harbor Hotel Boston, MA
4.8.13	NOCSAE SAC Meeting Westin Atlanta Airport Hotel Atlanta, GA
3.22.13	8 th Annual Brain Injury Rehabilitation Conference “The Concussion Crisis-Later Life Consequences” “Why We Need to Re-Think How Youth Sports Are Played” Sheraton Carlsbad Resort Carlsbad, CA
3.9.13	Second Matthew Gfeller Neurotrauma Symposium “Are Professional Sports Athletes Different From the Rest?” Chapel Hill, NC
1.27.13	NOCSAE Board Meeting SAC Presentation Fairmont Olympic Hotel Seattle, WA
12.1.12	APR Winter Board Meeting Atlantic City, NJ
11.16.12	NOCSAE Grant Meeting Chapel Hill, NC
11.14.12	“Concussion and Our Kids” Park School of Baltimore Baltimore, MD
11.4.12	4 th International Consensus Conference on Concussion in Sport Writing Group FIFA House Zurich Switzerland
10.31.12 - 11.4.12	4 th International Consensus Conference on Concussion in Sport “The NFL and Brain Safety First Since Zurich 2008” FIFA House Zurich Switzerland
10.27.12	Boston Sports Symposium “Protecting the Athlete’s Brain” Waltham Woods Conference Center Waltham, MA
10.26.12	2012 Brain Trauma and the Athlete Conference “Case Presentations and Discussion of Concussion, Post-Concussion Syndrome

And CTE”
The Conference Center at Bentley College
Waltham, MA

- 10.26.12 2012 Brain Trauma and the Athlete Conference
“Graduated Return to Play and Academics”
The Conference Center at Bentley College
Waltham, MA
- 10.26.12 2012 Brain Trauma and the Athlete Conference
“Pathophysiology and Biomechanics of Concussion, Head Injury, and
Second Impact Syndrome”
The Conference Center at Bentley College
Waltham, MA
- 10.25.12 2012 Hit Count Symposium
“Evidence of Dose-Related Brain Damage and Disease-Is there a Threshold?”
Waltham, MA
- 10.13.12 Eighteenth Annual Brain Injury Symposium
Keynote Speaker
“Short and Long-term Consequences of Repetitive Head Trauma, Post Concussion
Syndrome – CTE Chronic Traumatic Encephalopathy”
JW Marriott Hotel
Miami, FL
- 10.12.12 2nd Annual Conference Concussion in Athletics: From Brain to Behavior”
“Consequences of “Ignorance & Arrogance” in accurate assessment of sport-related
Concussions”
Penn State University, PA
- 9.30.12 Cleveland Clinic Lou Ruvo Center for Brain Health
“Chronic Traumatic Encephalopathy (CTE) Conference 2012”
“CTE in the NFL: What Changes Have Been Made and What More Needs to be Done?”
Frank Gehry – designed Keep Memory Alive Center
Las Vegas, NV
- 8.15.12 St. Mary’s Healthcare
Gloversville High School
“Short and Long-term Consequences of Repetitive Head Trauma, Post Concussion
Syndrome – CTE Chronic Traumatic Encephalopathy”
Gloversville, NY
- 8.15.12 St. Mary’s Healthcare
Amsterdam High School\
- “Short and Long-term Consequences of Repetitive Head Trauma, Post Concussion
Syndrome – CTE Chronic Traumatic Encephalopathy”
Amsterdam, NY
- 7.19.12 Center for the Study of Traumatic Encephalopathy
Presentation to President BU
- 6.14.12 NOCSAE Board Meeting
NOCSAE Scientific Advisory committee Report to the Board

Intercontinental Hotel
Kansas City, MO

- 6.1.12 ARP Annual Meeting
“Concussion and Head Trauma in Martial Arts”
San Francisco Marriott Marquis
San Francisco, CA
- 5.26.12 Congress AQMS 2012
“Concussion Update 2012”
Grenville-sur-la-Rouge
Montreal Canada
- 5.18.12 Children’ Hospital Annual Sports Medicine Meeting
Sports-Related Conference on Concussion and Spine Injury
“Prevention of Concussion: What Works, What Doesn’t”
Joseph B. Martin Conference Center
Boston, MA
- 5.11.12 Injuries in Football 2012
“Head and Spine Injuries in Football: Concussion: Where are We Now”
Andrews Institute
Destin, FL
- 4.24.12 FC Stars of MA
“Concussion Prevention”
Nashawtuc Country Club
Concord, MA
- 4.23.12 National School Board Association Meeting
“Head Injuries”
Boston Convention Center
Boston, MA
- 4.18.12 NOCSAE Retreat
Westin Atlanta Airport
Atlanta, GA
- 4.13.12 Emerson Hospital Grand Rounds
“Current Concepts and Future Trends in Concussion Evaluation, Management and Treatment”
Assembly Room A/B
Emerson Hospital
Concord, MA
- 4.11.12 FC Stars of MA
“Concussion Prevention”
Nashawtuc Country Club
Concord, MA
- 3.26.12 NFLPA Annual Meeting
Mackey-White Traumatic Brain Injury Committee
Marco Island Marriott
Marco Island, FL
- 3.23.12 2012 Harvard Law Sports Symposium
“Concussion Crisis in Professional Sports”

Panelist
Harvard Law School
Cambridge, MA

- 3.23.12 Parker Memorial DBP CME Program BU/BMC
"Youth Concussions: Diagnosis, Management Including Return to Play and Prevention"
Boston University School of Medicine
Boston, MA
- 3.21.12 FC Stars of MA
"Concussion Prevention"
Nashawtuc Country Club
Concord, MA
- 3.18.12 NHL Meeting
New York, NY
- 3.11.12 APR Meeting
JW Marriott
Indianapolis, IN
- 2.25.12 Professional Football Chiropractic Meeting
"Concussion Management: Short and Long-term Consequences of Mismanaging a Concussion"
Indianapolis, IN
- 2.25.12 Professional Football Chiropractic Meeting
"Catastrophic and Long-Term Outcomes After Traumatic Brain Injury"
Indianapolis, IN
- 1.28.12 LifeBridge Health Concussion Symposium
"Chronic Effects of Concussive Injury"
Sinai Hospital of Baltimore Zamoiski Auditorium
Baltimore, MD
- 1.25.12 Syracuse Neuroscience Grand Rounds
"Short and Long Term Consequences of Mismanaging a Concussion"
Upstate Medical University
Syracuse, NY
- 1.21.12 NOCSAE Board Meeting
SAC Report to Board of Trustees
Royal Palms
Phoenix, AZ
- 1.7.12 Eastern Athletic Trainers Association
"Concussion Update"
Copley Plaza
Boston, MA
- 12.10.11 Beth Israel Deaconess Hospital Core Curriculum Series
"Traumatic Brain Injury: From Concussions to More Severe Injuries"
Dedham Holiday Inn
Dedham, MA
- 12.9.11 Retired Men's Association
"Concussion Update"

First Baptist Church
Sudbury, MA

- 12.5.11 Congressional Hearings Testimony
NOCSAE
Congress
Washington, DC
- 11.17.11 Hyannis Rotary Club Luncheon
“Concussion Crisis”
Hyannis Country Club
Hyannis, MA
- 11.14.11 NOCSAE Youth Football Helmet Meeting
Westin Atlanta Airport
Atlanta, GA
- 11.4.11 Boston Shoulder and Sports Symposium 2011
“Concussion Update”
Conference Center at Waltham Woods
Waltham, MA
- 10.28.11 2011 Brain Trauma and Athletic Conference
Boston University Center for the Study of Traumatic Encephalopathy
“Return to Play Guidelines and Step-by-step Clinical Recommendations”
Framingham Sheraton
Framingham, MA
- 10.27.11 APR Annual Meeting
“Chronic Traumatic Encephalopathy”
Omni Orlando Resorts Championship Gate
Orlando, FL
- 10.24.11 Harvard University Lunch Time Learning Talk
“The neurophysiological cascade of concussion and brain damage – what is going on in the gray/white matter? Brain stem trauma – shearing/tearing – CNS damage from whiplash direct blows
Murr Center, Harvard University
Boston, MA
- 9.26.11 2011 Boston Public Schools Advanced Concussion Training
“Concussion Management for Coaches”
Northeastern University
Boston, MA
- 9.22.11 Athletics Committee Williams College
“New Trends in Concussion Management”
Williams College
Williamstown, MA
- 9.22.11 Athletics Committee Williams College
“Concussion for Coaches and Trainers”
Williams College
Williamstown, MA

- 9.21.11 Grand Rounds Haywood Hospital
“Current Evaluation and Management of Concussion”
Henry Haywood Hospital
Gardner, MA
- 7.23.11 1st Annual USOC Sports Medicine Symposium
“Keynote Presentation: Current Concepts and Future Trends in Concussion Evaluation,
Management, and Treatment
Olympic Training Center
Colorado Springs, CO
- 7.17.11 ATSNJ 2nd Annual Sports Concussion Summit
“Keynote Presentation: Long-Term Effects of Concussion
Wyndham Princeton Forrestal Village
Plainsboro, NJ
- 6.17.11 NOCSAE Board Meeting
“Report of the Scientific Advisory Committee Meeting of 4.22.11
Carolina Inn
UNC Chapel Hill
- 6.4.11 2011 Jacksonville Concussion Summit
“Concussion Management in your Community”
Brooks Rehabilitation Hospital
Jacksonville, FL
- 6.4.11 2011 Jacksonville Concussion Summit
“Concussion 101”
Brooks Rehabilitation Hospital
Jacksonville, FL
- 5.28.11 Canadian Athletic Trainers Association Annual Meeting
“Chronic Traumatic Encephalopathy”
Banff, Alberta Canada
- 5.27.11 Sports-Related Conference on Concussion & Spine Injury
“How the NFL Has Become a Leading Concussion Advocate”
Fenway Park
Boston, MA
- 5.7.11 Sports Related Concussion and Cervical Spine Injury Symposium
“Everything You Wanted to Know About Sports Related Concussion:
Epidemiology/Incidence/Research”
Rust Auditorium – North Shore University Hospital
Manhasset, NY
- 5.6.11 Andrews Institute “Injuries in Football” Conference
“Concussion: More Than Just a Headache”
Destin, FL
- 4.30.11 Inaugural UNC Matthew Gfeller Center Sport-Related Neurotrauma Symposium
“Catastrophic and Long-Term Outcomes of TBI”
UNC Chapel Hill

- 4.30.11 Inaugural UNC Matthew Gfeller Center Sport-Related Neurotrauma Symposium
“Pharmacological Interventions and Return-To-Play After Spinal Injury”
UNC Chapel Hill
- 4.29.11 Head Injury Symposium: Stunts & Tumbling, Cheerleading and other female sports
“Keynote Message, The Latest on the Concussion Crisis”
Omni Parker House Hotel
Boston, MA
- 4.22.11 NOCSAE Scientific Advisory Committee Meeting
Westin Atlanta
Atlanta, GA
- 4.1.11 MMS and DPS Sports Concussion Symposium and State Laws
“Concussion Management and Prevention”
Mass Medical Society Conference Room
Waltham, MA
- 3.23.11 RI Primary Care Physicians Corporation
“Concussion Management – New Strategies”
Crowne Plaza
Warwick, RI
- 3.19.11 Massachusetts Neurology Society
“Traumatic Brain Injury – Pathophysiologic Mechanisms”
Newton Marriott
Newton, MA
- 2.26.11 Joint Commission on Sports Medicine and Science
“Boxing Policy/Legislation: How it Can Be Improved”
Philadelphia Convention Center
Philadelphia, PA
- 2.26.11 Joint Commission on Sports Medicine and Science
“Concussion Landscape”
Philadelphia Convention Center
Philadelphia, PA
- 2.25.11 NFL Players Association Mackie/White TBI Committee
“Concussion and the Role of the Helmet”
Conrad Hotel
Indianapolis, Indiana
- 02.02.11 39th Annual INS Meeting
“Chronic Traumatic Encephalopathy: Long-term Consequences of Repetitive Brain Trauma”
Boston, MA
- 1.14.11 Washington DC Children’s Hospital
National Forum on Youth Sport Concussion Taking Action State by State
“The Concussion Landscape”
Children’s National Medical Center
Washington, DC
- 1.11.11 Brigham Young University College of Life Sciences
Sports Concussion and Brain Injury Seminar

- “Brain Injuries and Concussions”
Brigham Young University, Provo, UT
- 12.13.10 NFL Players Association Meeting
Mackey-White TBI Committee Members
Washington, DC
- 12.8.10 NFL Meeting
“NOCSAE: Current and future helmet standards”
NYC, NY
- 11.18.10 Retired Athletes Meeting
Chapel Hill, NC
- 11.10.10 Get aHead Workshop: Emerging Knowledge and Significance of Sports-Related Concussions
“International Perspective On Concussions”
Dartmouth-Hitchcock Medical Center
Hanover, NH
- 11.04.10 AAPRP Annual Meeting The Brain and Neck In Boxing and Related Sports
“Concussion Definitions and Clinical Manifestations”
Omni Orlando Resort at ChampionsGate
Orlando, FL
- 11.01.10 Hockey Concussion in Canada
Hockey Concussion Education Project (HCEP) – an Independent Physicians’ Study –
Presentation of findings – Press Conference
InterContinental Toronto Centre – Ontario Room
Toronto, Canada
- 10.29.10 Boston Shoulder and Sports Symposium 15th Annual
“Update Athletic Head and Neck Injuries”
Mass Medical Society Conference Center
Waltham, MA
- 10.20.10 Ice Hockey Summit: Action on Concussions
“Incorporating Hockey and Medical Knowledge with Action Items for Prevention”
Mayo Clinic
Rochester, MN
- 10.13.10 Lincoln Sudbury Regional High School Sports Conference
“Concussion in Sports Update”
LSRHS Auditorium
Sudbury, MA
- 10.5.10 “Gender and Age Effects On Concussion”
22nd Annual Ironman Sports Medicine Conference in Conjunction with the 2010
Ford Ironman World Championships
Royal Kona Resort
Kailua-Kona, HI
- 10.5.10 “Overview of Sports Related Concussion”
22nd Annual Ironman Sports Medicine Conference in Conjunction with the 2010
Ford Ironman World Championships

Royal Kona Resort
Kailua-Kona, HI

- 10.1.10 BU Second Annual Head Trauma in the Athlete Conference
Massachusetts Medical Society Auditorium
Waltham, MA
- 9.23.10 Emerson Hospital Youth Sports Injury Symposium
Concussions in Sports
Concord Carlisle High School Auditorium
Concord, MA
- 9.22.10 New Hampshire Pediatric Society
“Concussion Recognition, Management and Long term Sequellae”
SERESC Conference Center
Bedford, NH
- 9.15.10 Brigham and Women’s Hospital CORE Meeting
“Head Injuries and Athletes and Return to Play”
Brigham and Women’s offsite at Chestnut Hill
Chestnut Hill, MA
- 8.21.10 Athletic Trainers Association of New Jersey Concussion Summit
“Management of Concussion 2010”
Philadelphia, PA
- 6.28.10 “Coaches and Concussion”
Hooksett, NH
- 6.17.10 “Physical Fitness and Sports Medicine – Post Concussion”
“Short and Long Term Consequences of Mismanaging Concussion”
8th Annual Symposium on Men’s Health
Mass Medical Society Headquarters
Waltham, MA
- 6.12.10 United States Sports Academy
2009 United States Sports Academy Ernst Jokl Sports Medicine Award Presentation
To Dr. Robert Cantu
Harvard University
Cambridge, MA
- 5.18.10 Association of Chief Executives of Sport
“Short and Long Term Consequences of Mismanaging Concussion”
Antlers Hilton Hotel
Colorado Springs, CO
- 5.14.10 “What is a Concussion? Current Consensus Guidelines”
The Seventh Annual Sports-Related Conference on Concussion & Spine Injury
Presented by Brigham and Women’s Hospital
Fenway Park
Boston, MA
- 5.7.10 Keynote Speaker
“Chronic Traumatic Encephalopathy”

Neurology in the News
The University of Toledo, Department of Neurology and Center for Continuing Medical Education
Eleanor N. Dana Conference Center – University of Toledo
Toledo, Ohio

- 4.29.10 “Concussion in Sports Presentation at the CDC”
National Center for Injury Prevention and Control
Centers for Disease Control and Prevention
Atlanta, GA
- 4.26.10 “2010 Sports and Society Colloquium”
Brown University, Salomon Hall
Providence, RI
- 4.22.10 “Short and Long Term Consequences of Mismanaging an Athletic Concussion”
2010 Injuries in Football Course
Andrews Institute
Pensacola, FL
- 4.8.10 “Short and Long Term Consequences of Mismanaging Concussion”
Massachusetts General Hospital Neurosurgery Grand Rounds
Ether Dome, MGH
Boston, MA
- 4.7.10 “Short and Long Term Consequences of Mismanaging a Concussion”
Boston University Grand Rounds
Boston University School of Medicine Continuing Medical Education
Boston, MA
- 3.12.10 “The Triad of Symptomatic Concussion, Second Impact Syndrome and Thin Subdural Hematoma”
Is Football Bad for the Brain?
Forensic Scientific, Medical-Legal and Societal Aspects of Concussion Debate
The Cyril H. Wecht Institute of Forensic Science and Law
- 3.12.10 “Update on NFL Concussion Committee Experiences”
Is Football Bad for the Brain?
Forensic Scientific, Medical-Legal and Societal Aspects of Concussion Debate
The Cyril H. Wecht Institute of Forensic Science and Law
- 3.7.10 “Interactive Case Studies
Youth Sports Concussions: Education to Legislation
Kane Hall Rm 130
University of Washington Campus
Seattle, Washington
- 3.6.10 Keynote Speaker
“Chronic Traumatic Encephalopathy”
Youth Sports Concussions: Education to Legislation
Kane Hall Rm 130
University of Washington Campus
Seattle, Washington

- 2.18.10 “The Short and Long Term Consequences of Mismanaging Concussion”
Concussion and Mild Traumatic Brain Injury: Update 2010
CSM Annual Meeting
Omni San Diego Hotel
San Diego, CA
- 1.26.10 NFL Players Association Concussion Committee
Medical Committee
Breakers
Palm Beach, FL
- 1.9.10 “Concussions”
Eastern Athletic Trainers Association Annual Meeting
Marriott Copley
Boston, MA
- 11.10.09 “Managing Concussion”
Pediatric Brain Injury Conference – BIA-MA
Best Western Royal Plaza
Marlborough, MA
- 11.6.09 “Panel Discussion on TBI”
Partnership for Military Medicine Symposium
Omni Shoreham Hotel
Washington, DC
- 10.30.09 “Concussions”
Fourteenth Annual Boston Shoulder and Sports Symposium 2009
Conference Center
Waltham Woods, Waltham, MA
- 10.29.09 CNN - Lou Dobbs
“Testimony before U.S. House Judiciary Committee”
Time Warner Building – CNN Headquarters, NYC
New York, NY
- 10.29.09 “Testimony Before U.S. House Judiciary Committee – Hearing on Legal Issues Relating
To Football Head Injuries”
Rayburn Building
Washington, DC
- 10.16.09 “Study of Traumatic Encephalopathy”
The American Association of Professional Ringside Physicians, Inc.
2009 Annual Medical Seminar
Mohegan Sun
Uncasville, CT
- 10.2.09 Welcoming Remarks
“Overview of Current Concussion Consensus Statements Including Zurich Conference”
Concussion and the Athlete
Boston University Medical Center School of Medicine Continuing Education
Gillette Stadium, Foxboro, MA

- 10.2.09 “Panel Discussion”
Concussion and the Athlete
Boston University Medical Center School of Medicine Continuing Education
Gillette Stadium, Foxboro, MA
- 10.2.09 “Chronic Traumatic Encephalopathy and the Athlete – Update from the Center for the Study
Of Traumatic Encephalopathy”
Concussion and the Athlete
Boston University Medical Center School of Medicine Continuing Education
Gillette Stadium, Foxboro, MA
- 9.3.09 “Traumatic Brain Injury in Sports: When Can the Athlete Return to Play?”
XIV World Congress of Neurological Surgery of the WFNS
Boston, MA
- 6.18.09 “The Concussion Dilemma: Are We Headed in the Right Direction”
60th NATA Annual Meeting and Clinical Symposia
Henry B. Gonzalez Convention Center
San Antonio, TX
- 5.27.09 “Managing Sports Related Concussion in the Youth and Adolescent Athlete”
American College of Sports Medicine Annual Meeting
Seattle, WA
- 5.20.09 “Overview of Sports Concussion Consensus Statements and Chronic Traumatic
Encephalopathy”
Brain Injury Association of New Hampshire 26th Annual Brain Injury and Stroke Conference
Radisson, Manchester, NH
- 5.15.09 “Playing with Post Concussion Symptoms: Alarming Rates and Prevalence”
3rd Annual National Summit on Concussion and Other Sports Medicine Injuries
Westin Hotel LAX
Los Angeles, CA
- 5.15.09 “What Should a Concussion Evaluation Consist Of”
3rd Annual National Summit on Concussion and Other Sports Medicine Injuries”
Concurrent Afternoon Session
Westin LAX
Los Angeles, CA
- 5.14.09 Keynote Address:
College Athletic Trainers’ Society
2009 Spring Symposium for Athletic Trainers and Team Physicians
The Orleans Hotel and Casino
Las Vegas, Nevada
- 5.9.09 “Concussion Management: Yesterday, Today and Tomorrow”
Sanford Sports Medicine Symposium
Sanford University South Dakota Medical Center
Sioux Falls, South Dakota
- 5.9.09 “Return to Play Issues Following Cervical Spine Injury”
Sanford Sports Medicine Symposium
Sanford University South Dakota Medical Center
Sioux Falls, South Dakota

- 5.9.09 “Catastrophic and Long Term Effects of Concussion”
Sanford Sports Medicine Symposium
Sanford University South Dakota Medical Center
Sioux Falls, South Dakota
- 5.9.09 “On-the-Field Management of the Concussed Athlete”
Sanford Sports Medicine Symposium
Sanford University South Dakota Medical Center
Sioux Falls, South Dakota
- 5.1.09 “Overview: Current Concussion Guidelines from the International Study Group”
6th Annual Sports Conference
BWH Hospital Conference
Fenway Park
Boston, MA
- 4.27.09 “Coaches Education Initiative”
Neurologic Head and Spine Injuries Semester Course Lecture
University of North Carolina – Doctorate Program Presentation
Chapel Hill, NC
- 4.27.09 “Celebrity Athletes – Is Management the Same?”
Neurologic Head and Spine Injuries Semester Course Lecture
University of North Carolina – Doctorate Program Presentation
Chapel Hill, NC
- 4.27.09 “Legal Case Discussion Sport and the Law”
Neurologic Head and Spine Injuries Semester Course Lecture
University of North Carolina – Doctorate Program Presentation
Chapel Hill, NC
- 4.21.09 “Traumatic Brain Injury & Physiological Disorders Facing Athletes Post Performance”
Summit on Health of the Former Professional Athlete
LaQuinta Spa and Resort
Palm Springs, CA
- 4.13.09 “Pharmacological Interventions in Management of Spine Injuries”
Neurologic Head and Spine Injuries Semester Course Lecture
University of North Carolina – Doctorate Program Presentation
Chapel Hill, NC
- 4.13.09 “Return to Play After Spinal Injury”
Neurologic Head and Spine Injuries Semester Course Lecture
University of North Carolina – Doctorate Program Presentation
Chapel Hill, NC
- 4.13.09 “Spine Injuries and Contraindications to Participation in Collision Sports”
Neurologic Head and Spine Injuries Semester Course Lecture
University of North Carolina – Doctorate Program Presentation
Chapel Hill, NC
- 4.5.09 “Current Concussion Classification and Return to Play Criteria”
First Annual Spring Current Concepts in Sports Related Concussions Symposium

Athletic Trainer Solutions
St. Paul Catholic High School
Bristol, CT

- 3.16.09 “Overview of Injury Types and Associated Complications”
Neurologic Head and Spine Injuries Semester Course Lecture
University of North Carolina – Doctorate Program Presentation
Chapel Hill, NC
- 3.16.09 “Anatomy and Biomechanics of Spine Injuries in Sport”
Neurologic Head and Spine Injuries Semester Course Lecture
University of North Carolina – Doctorate Program Presentation
Chapel Hill, NC
- 3.16.09 “Spine Injuries – Which Sports are at Greatest Risk and Why?”
Neurologic Head and Spine Injuries Semester Course Lecture
University of North Carolina – Doctorate Program Presentation
Chapel Hill, NC
- 2.16.09 “Case Studies”
Neurologic Head and Spine Injuries Semester Course Lecture
University of North Carolina – Doctorate Program Presentation
Chapel Hill, NC
- 2.16.09 “Parkinson’s Disease”
Neurologic Head and Spine Injuries Semester Course Lecture
University of North Carolina – Doctorate Program Presentation
Chapel Hill, NC
- 2.16.09 “Chronic Traumatic Encephalopathy”
Neurologic Head and Spine Injuries Semester Course Lecture
University of North Carolina – Doctorate Program Presentation
Chapel Hill, NC
- 2.16.09 “Post Concussion Syndrome”
Neurologic Head and Spine Injuries Semester Course Lecture
University of North Carolina – Doctorate Program Presentation
Chapel Hill, NC
- 1.27.09 Press Conference
Chronic Traumatic Encephalopathy
In Association with the Super Bowl
Tampa, Florida
- 1.26.09 “Anatomical Dissection of the Brain”
Neurologic Head and Spine Injuries Semester Course Lecture
University of North Carolina – Doctorate Program Presentation
Chapel Hill, NC
- 1.26.09 “Headaches in the Athlete”
Neurologic Head and Spine Injuries Semester Course Lecture
University of North Carolina – Doctorate Program Presentation
Chapel Hill, NC
- 1.26.09 “Epilepsy and Athletics”
Neurologic Head and Spine Injuries Semester Course Lecture

University of North Carolina – Doctorate Program Presentation
Chapel Hill, NC

- 1.26.09 “Stroke in Athletes”
Neurologic Head and Spine Injuries Semester Course Lecture
University of North Carolina – Doctorate Program Presentation
Chapel Hill, NC

- 1.26.09 “Malignant Brain Edema and Second Impact Syndrome”
Neurologic Head and Spine Injuries Semester Course Lecture
University of North Carolina – Doctorate Program Presentation
Chapel Hill, NC

- 1.26.09 “Intercerebral Hematoma”
Neurologic Head and Spine Injuries Semester Course Lecture
University of North Carolina – Doctorate Program Presentation
Chapel Hill, NC

- 1.17.09 “Current Testing and Return to Play Issues/Guidelines – Zurich Update”
London Hockey Concussion Summit
London Hilton Hotel
London, Ontario, Canada

- 1.12.09 “Ionic and Metabolic Consequences of Concussion”
Neurologic Head and Spine Injuries Semester Course Lecture
University of North Carolina – Doctorate Program Presentation
Chapel Hill, NC

- 1.12.09 “Athletic Head Injuries – Which Sports are at Greatest Risk and Why?”
Neurologic Head and Spine Injuries Semester Course Lecture
University of North Carolina – Doctorate Program Presentation
Chapel Hill, NC

- 1.9.09 “Post Concussion Syndrome and Traumatic Encephalopathy”
Emerson Hospital Medical Staff Clinical Conference
Emerson Hospital, Concord, MA

- 1.6.09 “Post Concussion Syndrome and Traumatic Encephalopathy”
Boston University Grand Rounds Presentation
Boston, MA

- 10.30-31.08 “Is Immediate Return to Play in the Same Game Ever Justified?”
3rd International Conference on Concussion in Sport
Hotel Zurichberg
Zurich Switzerland

- 10.18.08 “Pituitary Dysfunction in Professional Boxing and the National Football League”
2008 Annual Medical Seminar, AAPRP
Paris/Bally’s Resort & Casino
Las Vegas, Nevada

- 10.3.08 “Return to Boxing After Subdural Hematoma – When?”
World Boxing Association Medical Seminar, 87th Annual Convention
Hotel Barcelo Bavaro Palace

Punta Cana, Dominican Republic

- 9.18.08 “Traumatic Brain Injury and Shaken Baby Syndrome”
14th International Conference Child Abuse Allegations: Separating Scientific Fact from Fiction
Riviera Hotel and Casino
Last Vegas, NV
- 7.24.08 “Preventive Aspects of Sports Concussion”
New Developments in Sports-Related Concussion Conference
Sheraton Station Square
Pittsburgh, PA
- 6.21.08 “Concussion in Sports”
New York State Public High School Athletic Association (NYSPHSAA)
Saratoga, NY
- 6.11.08 “Neurotrauma in Sports”
Symposium on the Prevention of Spinal Cord Injuries and Concussions in Hockey
Hockey Hall of Fame
Toronto, Canada
- 5.28.08 “Neuropsychological Assessment of the Concussed Athlete: Only One Piece of the Concussion
Puzzle”
ACSM 55th Annual Meeting
Indianapolis, IN
- 5.9.08 “Concussion in Women Athletes”
2008 Sports Related Conference on Concussion and Spine Injury
Brigham and Women’s Hospital
Fenway Park
Boston, MA
- 5.3.08 “Concussion in Sports”
The Hill School
Pottstown, PA
- 5.1.08 “Concussion and High School Sports, Risks and Management”
Arlington High School
Arlington, MA
- 4.19.08 “Concussion in Sports: Does Gender Matter?”
The National Concussion Summit
Concussion in Sports: Advancing Health and Safety
Marriott Hotel
Marina del Rey, CA
- 4.18.08 “Concussion in Sports: Does Gender Matter?”
The National Concussion Summit
Concussion in Sports: Advancing Health and Safety
Marriott Hotel
Marina del Rey, CA
- 4.3.08 “Concussions and Sports”

Winchester High School
Winchester, MA

- 3.13.08 “Clinical Models for Concussion Management and Return to Play”
Fourth International Meeting on Minor Traumatic Brain Injury in Sports
Hotel Crystal, St. Moritz, Switzerland
- 3.8.08 “Concussions and the Sports Legacy Institute”
Joint Commission on Sports Medicine and Science 2008
New Orleans Hilton Riverside
New Orleans, LA
- 12.13.07 “Current Advances in Concussion Management/Traumatic Encephalopathy”
Grand Rounds
Brigham and Women’s Hospital
Boston, MA
- 11.29.07 “Concussion in Sports”
Two presentations to student assemblies
Concord Carlisle High School
Concord, MA
- 11.28.07 “Concussion and Sports”
Presentation for parents, coaches, trainers, nurses and physicians
Concord Carlisle High School
Concord, MA
- 11.26.07 “Chronic Traumatic Encephalopathy/Concussion”
Boston Medical Center Grand Rounds
Boston Medical Center
Boston, MA
- 11.29.07 “Update Baby Joe Mesi”
Medical Advisory Board Meeting
Massachusetts Boxing Commission
McCarthy Building
Boston, MA
- 11.29.07 “More Than Just a Bump on the Head”
Concord Carlisle High School Students Presentation
Two Presentations One hour each to student body
Concord, MA
- 11.28.07 “More Than Just a Bump on the Head”
Concord Carlisle High School Parents Presentation
Concord, MA
- 11.26.07 “Concussion and Sports Related Head Injury”
Neurosurgery/Surgery Grand Rounds
Boston University Medical Center
Boston , MA
- 11.15.07 “Joe Mesi Update”
AAPRP Annual Meeting

Intercontinental Hotel and Resort
San Juan, Puerto Rico

- 10/29/07 “Concussion in High School”
Woburn High School
Woburn, MA
- 10/26/07 “Concussion and Sudden Death: Coping With Two Crises”
Independent School Health Association Annual Meeting
New Canaan Country School
New Canaan, CT
- 9/27/07 “Concussions in High School”
Austin Prep School
Reading, MA
- 9/24/07 “The Concussion Crisis in Football”
U Mass Lowell Athletic Department Meeting
McGauvran Hall
Lowell, MA
- 9/17/07 “History of Concussion and Second Impact Syndrome”
New Hampshire Interscholastic Athletic Association
Annual Meeting
Courtyard by Marriott
Concord, NH
- 7/13/07 “Concussion/Brain”
The American Orthopedic Society for Sports Medicine Annual Meeting
TELUS Convention Center
Calgary, Canada
- 7/12/07 “Spine Instructional Course”
The American Orthopedic Society for Sports Medicine Annual Meeting
TELUS Convention Center
Calgary, Canada
- 6/1/07 The D.B. Historical Lecture
“The Evolution of Sports-related Concussion Recognition, Management and Prevention: The
Science, the Art and the Politics.”
Annual Meeting ACSM
New Orleans, Louisiana
- 5.5.07 “Concussion: How to make the diagnosis and Overview of Current Concussion Consensus
Statements”
Sports Specific Rehabilitation Program
High Performance Sports, Inc.
Peabody, MA
- 4/30/07 “Concussion Management and Diagnosis”
New England University Medical Department Seminar
New England University
Biddeford, ME

- 4/27/07 “Overview of Current Concussion Consensus Statement”
2007 Sports Related Conference on Concussion and Spine Injury
Fenway Park
Boston, MA
- 4.20.07 “Traumatic Encephalopathy Among NFL Players”
The National Concussion Summit. Concussion in Sports: The Under-Recognized Public
Epidemic
The Marriott Hotel
Los Angeles, CA
- 4/20/07 “Concussion in Sports: State of the Science - Discussant
The National Concussion Summit: Concussion in Sports: The Under-Recognized Public
Epidemic
The Marriott Hotel
Los Angeles, CAS
- 4/18/07 “Argument to Ban Boxing – Analysis of Neurological Injury”
75th Annual Meeting of the American Association of Neurological Surgeons
Washington, DC
- 3/15/07 “Can the Recognition and Treatment of Hypopituitarism After mTBI Influence Post Concussion
Syndrome”
Third International Meeting on Minor Traumatic Brain Injuries in Sports
St. Moritz, Switzerland
- 3/14/07 “How Many Concussion Are Too Many”
Third International Meeting on Minor Traumatic Brain Injuries in Sports
St. Moritz, Switzerland
- 12/8/06 “Cervical Spine Return to Play Issues”
ACSM - Advanced Team Physician Course
Omni Orlando Resort at Championsgate
Orlando, FL
- 12/8/06 “MBTI Return to Play Issues”
ACSM Advanced Team Physician Course
Omni Orlando Resort at Championsgate
Orlando, FL
- 11/9/06 “Concussion Management”
Acute Management of Mild Traumatic Brain Injury in Military Operational Settings
Department of Defense Meeting
Washington, DC
- 10/24/06 “A Case of Concussion in Pop Warner Football”
Playing It Safe
Brain Injury Association of Massachusetts Sports Injury Conference
Best Western Royal Plaza Hotel
Marlborough, MA
- 9/15/06 “Intracranial Bleeding in Boxing/The Joe Mesi Story Round 3”
American Association of Professional Ringside Physicians

2006 Annual Medical Seminar
Luxor Hotel and Casino
Las Vegas, NV

9/9/06	“Neurosurgery Head and Neck Injury Update” Emerson Hospital Fall Sports Primer Harvey Wheeler Community Center Concord, MA
05/19/06	Case Presentations Sports Related Concussion and Spine Injury Conference 2006 Brigham and Women’s Neurological Injury Center Fenway Park Boston, MA
05/13/06	“Management of Cervical Injuries and Related Disorders” Sports Medicine and Football: The 2006 Perspective AOSSM Meeting Seminole Hard Rock Hotel and Casino Hollywood, FL
05/12/06	Physical Examination Spine Sports Medicine and Football: The 2006 Perspective AOSSM Meeting Seminole Hard Rock Hotel and Casino Hollywood, FL
03/10/06	“Return to Boxing After Intracranial Hemorrhage” USA Boxing Physician Symposium 2006 US Olympic Training Center Colorado Springs, CO
03/10/06	“Acute and Chronic Brain Injuries in Boxing” USA Boxing Physician Symposium 2006 US Olympic Training Center Colorado Springs, CO
03/07/06	“Acute TBI Assessment and Secondary Prevention” Armed Forces Epidemiological Board Meeting Armed Forces Medical Intelligence Center Fort Detrick Frederick, MD
02/24/06	“Evolution of the Understanding of Concussion” Concussion in Youth Sports Summit Brain Injury Association of New Jersey Stadium Club at Giants Stadium Rutherford, NJ
10/28/05	“PASSOR: Sub-Acute Assessment and Management: Grading Systems: Initial Symptom Management: Second Impact Syndrome: When to Order Imaging” American Academy of Physical Medicine and Rehabilitation 2005 Annual Assembly Philadelphia Marriott Downtown

Philadelphia, PA

- 10/28/05 “PASSOR: Concussion/Mild Traumatic Brain Injury: Return to Play and Function Decision Making”
American Academy of Physical Medicine & Rehabilitation
2005 Annual Assembly
Philadelphia Marriott Downtown
Philadelphia, PA
- 10/27/05 “PASSOR: Vienna Conference Update and Future Decisions: Meet the Experts”
American Academy of Physical Medicine & Rehabilitation
2005 Annual Assembly
Philadelphia Marriott Downtown
Philadelphia, PA
- 6/25/05 “Catastrophic Spine Injury in American Football – effect of athlete education and rule change”
1st World Congress on Sports Injury Prevention
Holmenkollen Park Hotel
Oslo, Norway
- 5/20/05 “What’s New in Concussion Research and Overview of Prague Concussion Consensus Statement
Brigham and Women’s 2nd Annual Sports Medicine Symposium
Gillette Stadium
Foxboro, MA
- 5/20/05 “NATA/AFCA Spearing in Football Task Force Recommendations”
Brigham and Women’s 2nd Annual Sports Medicine Symposium
Gillette Stadium
Foxboro, MA
- 5/13/05 “Concussion in Sports”
Mass Academy of Family Physicians Annual Meeting
Fort Point Sheraton
Leominster, MA
- 4/30/05 “Interesting Sport Medicine Cases of Concussion in Athletes”
Concussion in Sports Conference
Penn State University
The Penn Stater Conference Center Hotel
University Park, PA
- 4/29/05 “Concussion Classification: Scales and Categories”
Concussion in Sports Conference
Penn State University
The Penn Stater Conference Center Hotel
University Park, PA
- 3/10/05 “Catastrophic Spinal Injuries in Football”
5th Annual Sports Medicine and Neurotrauma Review

Portofino Bay Hotel
Orlando, FL

- 3/10/05 “Management of Difficult Spine Cases In Athletes”
5th Annual Sports Medicine and Neurotrauma Review
Portofino Bay Hotel
Orlando, FL
- 3/12/05 “When to Retire After a Concussion”
5th Annual Sports Medicine and Neurotrauma Review
Portofino Bay Hotel
Orlando, FL
- 3/12/05 “Can Second Impact Syndrome Be Eliminated?”
5th Annual Sports Medicine and Neurotrauma Review
Portofino Bay Hotel
Orlando, FL
- 3/12/05 “Recommendations from 2004 NATA Position Statement”
5th Annual Sports Medicine and Neurotrauma Review
Portofino Bay Hotel
Orlando, FL
- 3/12/05 “2004 Prague International Concussion Conference Consensus Statement”
5th Annual Sports Medicine and Neurotrauma Review
Portofino Bay Hotel
Orlando, FL
- 3/15/05 “Concussion, Head and Neck Injuries”
Spring Sports Primer
Emerson Hospital/Harvey Wheeler Community Center
West Concord, MA
- 2/9/05 “Alanto-Occipital Dislocation – A Largely Preventable Previously Fatal Injury”
Motorsports Safety Conference
American College of Sports Medicine Team Physician Pre Conference Course
Hyatt Regency on the Boardwalk
San Antonio, TX
- 11/5/04 “National Football League (NFL) and NCAA Football Study”
IIHF Meeting
Second International Symposium on Concussion in Sport
Prague, Czech Republic
- 11/6/04 “How can we prevent diffuse brain swelling/SIS in children?”
IIHF Meeting
Second International Symposium on Concussion in Sport
Prague, Czech Republic
- 11/6/04 “When Should an Athlete Retire Following Concussion”
IIHF Meeting
Second International Symposium on Concussion in Sport

Prague, Czech Republic

9/23/04	“Primary Care Management of Closed Head Injuries” Southboro Medical Group Meeting Southboro, MA
7/18/04	“Concussion Guidelines - Current Status” University of Pittsburgh Medical Center New Developments in Sports – Related Concussion The Westin Convention Center Pittsburgh, PA
6/24/04	NFL Meeting NFL Headquarters New York, NY
6/16/04	Press Conference “Position Statement on Sports – Related Concussion” National Athletic Trainers Association Annual Meeting Baltimore, MD
5/22/04	“Diffuse Brain Injuries” The William W. Backus Hospital Trauma Department Athletic Injuries of the Head and Neck Foxwood Resort Casino Uncasville, CT
5/4/04	“Fatal Brain Injuries in American Football (1945-1999)” Sports Concussion and Spine Injury Conference Brigham and Women’s Hospital Fenway Park Boston, MA
5/1/04	“Challenges In Identifying and Treating Sports Injuries” 2004 AANS Annual Meeting Orlando Convention Center Orlando, FL
4/6/04	“Concussions in the Active Child, Adolescent, and Young Adult: Current Concepts, New Findings and Re-Education” Massachusetts Medical Society Meeting Waltham, MA
9/11/03	“Head Injury and the Risk of Alzheimer’s Disease and Depression” American Association of Ringside Physicians Aladdin Hotel Las Vegas, Nevada
7/4/03	“Effects of Dehydration on Race Car Drivers” Daytona Pepsi 400 Race Daytona International Speedway

Daytona Beach, Florida

- 6/21/03 “Cervical Spinal Stenosis – A Contraindication for Collision Sports”
International Academy for Sports Dentistry 2003 Annual Meeting
Caribe Hilton Hotel
San Juan, Puerto Rico
- 6/20/03 “Cerebral Concussion Controversies in Sports”
International Academy for Sports Dentistry 2003 Annual Meeting
Caribe Hilton Hotel
San Juan, Puerto Rico
- 5/30/03 “Emergency Care of the Spine Injured Athlete”
American College of Sports Medicine Annual Meeting
San Francisco Convention Center
San Francisco, California
- 5/30/03 “On-the-Field Management of the Spine-Injured Athlete”
American College of Sports Medicine Annual Meeting
San Francisco Convention Center
San Francisco, California
- 5/30/03 “Life After Football: History of Concussive Injuries, Onset of Neurologic Disorders, and
Mental Health Issues in former NFL Players”
American College of Sports Medicine Annual Meeting
San Francisco Convention Center
San Francisco, California
- 5/9/03 “Athletic Head and Spine Injuries and Return To Play Decisions”
3rd Annual Legacy Neurosurgery Symposium
Legacy Good Samaritan Hospital
Portland, Oregon
- 4/29/03 “Challenges in Identifying and Testing Sport Injuries”
American Association of Neurological Surgeons Annual Meeting
San Diego, CA
- 3/8/03 “Acute Concussion Evaluation and Post Concussion Syndrome”
Texas ACMS Annual Meeting
Omni Houston Hotel Westside
Houston, Texas
- 1/16/03 “ACSM Motorsports Taks Force Committee Report”
International Council Motorsports Sciences
Mirage Hotel
Las Vegas, Nevada
- 2/7/03 “Brain Fatalities in American Football Over the Last 55 Years”
3rd Annual Neurotrauma and Sports Medicine Review
Grand Floridian Hotel
Orlando, Florida

- 2/7/03 “Interesting Sports Medicine Cases: A Potpourri of Head and Spine Cases”
3rd Annual Neurotrauma and Sports Medicine Review
Grand Floridian Hotel
Orlando, Florida
- 2/7/03 “Ongoing Concussion Controversy”
3rd Annual Neurotrauma and Sports Medicine Review
Grand Floridian Hotel
Orlando, Florida
- 2/8/03 “On-going Cervical-Spinal Stenosis Controversy”
3rd Annual Neurotrauma and Sports Medicine Review
Grand Floridian Hotel
Orlando, Florida
- 12/5/02 “Closed Head Injuries”
Thirtieth Annual Meeting Cervical Spine Research Society
Fontainebleu Hilton Hotel
Miami Beach, Florida
- 12/5/02 “On-the-Field Evaluation of Head Injuries”
Thirtieth Annual Meeting Cervical Spine Research Society
Fontainebleu Hilton Hotel
Miami Beach, Florida
- 9/26/02 “Concussion Guidelines and Return to Play Criteria”
Greater New York State Orthopedic Association
Saratoga, N.Y.
- 7/20/02 “Concussion in Sports Medicine”
New Developments in Sports Related Concussion
University of Pittsburgh School of Medicine
Pittsburgh, PA
- 6/19/02 “Concussion in Sports Medicine”
Sports Medicine Core Curriculum Series Harvard Medical School
Massachusetts General Hospital
Boston, MA
- 6/16/02 “Introduction to the Problem: The Grading Scale and RTP Dilemma”
National Athletic Trainers Association: Annual Meeting
Dallas, TX
- 6/5/02 “Concussion in Athletic Sports-Controversies Regarding Grading and Return to Play
Guidelines”
Connecticut Athletic Trainers Association Annual Meeting
Trinity College
Hartford, Connecticut
- 6/1/02 “On-the-Field Evaluation of Head and Neck Injured Athletes”
American College of Sports Medicine: Annual Meeting
St. Louis, MO
- 5/31/02 “Prehospital Care of the Spine-Injured Athlete: A Critical Look at the Task Force Document”

American College of Sports Medicine: Annual Meeting
St. Louis, MO

5/31/02 “On-the-Field Evaluation of Head and Neck Injuries”
American College of Sports Medicine: Annual Meeting
St. Louis, MO

5/30/02 “The Pros and Cons of Neuropsychological Testing in Concussion”
“The Practical Use of Neuropsychological Testing: Clinically and in Research”
American College of Sports Medicine: Annual Meeting
St. Louis, MO

4/13/02 “Grading Scale for Concussion in Sports”
American Academy of Neurology
Denver, Colorado

2/16/02 “Overview of Concussion”
2nd Annual Neurotrauma and Sports Medicine Review
Alleghany Hospital, Pittsburgh, PA
Caribe Royale Resort Suites and Villas
Orlando, Florida

2/16/02 “Head Injury in Recreational Sports”
2nd Annual Neurotrauma and Sports Medicine Review
Alleghany Hospital, Pittsburgh, PA
Caribe Royale Resort Suites and Villas
Orlando, Florida

2/16/02 “Guidelines for Return to Competition after a Mild Head Injury”
2nd Annual Neurotrauma and Sports Medicine Review
Alleghany Hospital, Pittsburgh, PA
Caribe Royale Resort Suites and Villas
Orlando, Florida

11/3/01 “Panel Discussion: When to retire from sports”
European Sports Medicine Conference
Vienna, Austria

11/3/01 “Assessing Concussions: Review of Grading Systems”
European Sports Medicine Conference
Vienna, Austria

10/1/01 “Neurosurgical Management of Athletic Injuries”
Congress of Neurological Surgeons 51st Annual Meeting
San Diego, California

10/1/01 “On-the-Field Management of Head and Neck Injuries”
Kerlin Jobe Clinic
Los Angeles, California

7/28/01 New Developments in Sports Related Concussion
“Models of Concussion Management: Current Models of Concussion”

Management: Where Are We Headed?"

University of Pittsburgh School of Medicine Center for Continuing Education in the Health Sciences, Department of Orthopedic Surgery, UPMC Health System Center for Sports Medicine, Western Psychiatric Institute and Clinic

Hilton Hotel, Pittsburgh, PA

- 6/8/01 "Second Impact Syndrome"
Manitoba Public Insurance and the Workers Compensation Board of Manitoba Continuing Medical Education Guest Speakers Series
Winnipeg, Canada
- 6/8/01 "Return to Play After Concussion"
Manitoba Public Insurance and the Workers Compensation Board of Manitoba Continuing Medical Education Guest Speakers Series
Winnipeg, Canada
- 6/8/01 "Concussion Grading Systems"
Manitoba Public Insurance and the Workers Compensation Board of Manitoba Continuing Medical Education Guest Speakers Series
Winnipeg, Canada
- 6/8/01 "Biomechanical and Pathophysiology of Head Injury"
Manitoba Public Insurance and the Workers Compensation Board of Manitoba Continuing Medical Education Guest Speakers Series
Winnipeg, Canada
- 6/8/01 "Overview of Concussion"
Manitoba Public Insurance and the Workers Compensation Board of Manitoba Continuing Medical Education Guest Speakers Series
Winnipeg, Canada
- 6/8/01 "Guidelines to the Evaluation of Mild Traumatic Brain Injury in Motor Vehicle Accidents and Work Injuries"
Manitoba Public Insurance and the Workers Compensation Board of Manitoba Continuing Medical Education Guest Speakers Series
Winnipeg, Canada
- 5/31/01 "On-the-Field Evaluation of Head and Neck Injuries"
American College of Sports Medicine Annual Meeting
Baltimore Convention Center
Baltimore, Maryland
- 5/31/01 "Return to Play Decisions Following Concussion: Controversies and Dilemmas"
American College of Sports Medicine Annual Meeting
Baltimore Convention Center
Baltimore, Maryland
- 5/30/01 "NASCAR Deaths: Were they preventable"
American College of Sports Medicine Annual Meeting
Baltimore Convention Center
Baltimore, Maryland

- 5/19/01 “Concussion: It’s Effect Upon the Brain”
Salem Sports Medicine Conference Head and Neck Injuries in Athletes
Colonial Sheraton
Lynnfield, Massachusetts
- 5/7/01 “On-the-Field Evaluation of Athletic Head and Spine Injury”
New York State Public High School Athletic Association
Carrier Circle Holiday Inn
Syracuse, New York
- 5/7/01 “Evaluation, Treatment and Return to Play Decisions Regarding Athletic Head and Spine Injury”
New York State Public High School Athletic Association
Carrier Circle Holiday Inn
Syracuse, New York
- 5/5/01 “Athletic Cervical Spine Injuries”
American Academy of Neurology 53rd Annual Meeting
Pennsylvania Convention Center
Philadelphia, PA
- 3/19/01 “NASCAR Deaths: Were they preventable”
Neurotrauma and Sports Medicine for the New Millennium
Department of Neurosurgery, Allegheny General Hospital
The Shadow Ridge Hotel and Conference Center
Park City, Utah
- 3/19/01 “Adult vs. Pediatric Athletic Spine Injuries: Management Issues”
Neurotrauma and Sports Medicine for the New Millennium
Department of Neurosurgery, Allegheny General Hospital
The Shadow Ridge Hotel and Conference Center
Park City, Utah
- 3/19/01 “Athletic Head and Spinal Cord Injuries”
Neurotrauma and Sports Medicine for the New Millennium
Department of Neurosurgery, Allegheny General Hospital
Park City, Utah
- 3/19/01 “On-the-Field Management of Athletic Head Injuries”
Neurotrauma and Sports Medicine for the New Millennium
Department of Neurosurgery, Allegheny General Hospital
The Shadow Ridge Hotel and Conference Center
Park City, Utah
- 3/19/01 “Overview of Concussion”
Neurotrauma and Sports Medicine for the New Millennium
Department of Neurosurgery, Allegheny General Hospital
The Shadow Ridge Hotel and Conference Center
Park City, Utah

- 12/2/00 “Second Impact Syndrome”
Sports Neurology Injuries of the Head and Spine
Hospital for Special Surgery, Burke Rehabilitation Hospital and the Weill Medical College of
Cornell University
Uris Auditorium
New York, New York
- 11/18/00 “Catastrophic Football Head Injuries”
Southwest Chapter American College Sports Medicine 2000 Annual Meeting
Bahia Hotel
San Diego, CA
- 11/3/00 “Practical Management of Head Injuries and Concussion in Sport
British Association of Sports and Exercise Medicine
Hilton Puckrup Hall
Tewkesbury, Gloucestershire England
- 9/16/00 “Diagnosis and Nonsurgical Treatment and Rehabilitation of Degenerative Cervical
Conditions”
7th Annual Symposium New Hampshire Musculoskeletal Institute
Saint Anselm College, Manchester, NH
- 06/04/99 “On-The-Field Evaluation of Head and Neck Injuries”
American College of Sports Medicine: Annual Meeting
Washington State Convention and Trade Center
Seattle, Washington
- 06/03/99 “Concussion Symposium”
American College of Sports Medicine: Annual Meeting
Washington State Convention and Trade Center
Seattle, Washington
- 05/28/99 “Concussion: Mechanisms and Classifications”
Sports Related Concussions and Nervous System Injury Conference
Orlando Regional Healthcare System
Hotel Royal Plaza
Orlando, Florida
- 12/10/98 “Headaches”
Middlesex Community College Community Lecture
Bedford, Massachusetts
- 11/08/98 “Sports Related Concussion Controversies: Neuropsychological Aspects and Return to
Play Issues:
Traumatic Brain Injury and Stroke Conference
Healthsouth Braintree Rehabilitation Hospital
Royal Sonesta Hotel
Boston, Massachusetts
- 06/06/98 “Examination of the Spine”
American College of Sports Medicine: Annual Meeting

Orange County Convention Center
Orlando, Florida

- 06/05/98 “Age, Ethical, Sociological, and Safety Issues in Boxing Especially as Regards Head Injury”
American College of Sports Medicine: Annual Meeting
Orange County Convention Center
Orlando, Florida
- 06/02/98 “Age in Boxing: Should there be an age limit”
XXVI FIMS World Congress of Sports Medicine
Orange County Convention Center
Orlando, Florida
- 05/15/98 “Return to Sports Criteria Following Concussion”
Innovative Symposiums/Sports Related Concussion
Smithtown Sheraton
Long Island, New York
- 05/15/98 “Concussion Classification and Implementation”
Innovative Symposiums/Sports Related Concussion
Smithtown Sheraton
Long Island, New York
- 05/08/98 “Fitness Over Forty and Fifty”
Lincoln-Sudbury Auxiliary Board Meeting
Pierce House, Lincoln
- 04/24/98 “The Concussion Controversy/Grading and Return to Play”
Sports Medicine Update ‘98 and NEACSM Spring Meeting
Sunrise/Mediplex, Concord, MA
Program Co-chair
- 04/07/98 “Living With Low Back Pain”
Emerson Hospital Community Lecture Series
Emerson Hospital
Concord, Massachusetts
- 03/17/98 “Head Injury in Sports”
Boston Medical Center
Department of Rehabilitation Medicine
Boston, Massachusetts
- 03/07/98 “Safety Issues In Boxing Regarding Head Injury”
Sports Related Concussion and Nervous System Injuries
Orlando Regional Healthcare System
Caribe Royale Resort
Lake Buena Vista, Florida
- 02/06/98 “Neurologic and Vascular Causes of Upper Extremity Problems
(Cervical Spine Stingers, Peripheral Nerve, Brachial Plexus, Thoracic Outlet)
American College of Sports Medicine’s Team Physician Course
San Diego Princess Resort
San Diego, California

02/06/98	<p>“Cervical Spine Injury, Extra Axial Facet, Disk, Radicular Symptoms, and Transient Quadriplegia” <u>American College of Sports Medicine’s Team Physician Course</u> San Diego Princess Resort San Diego, California</p>
02/06/98	<p>“Epilepsy and Sports Participation” <u>American College of Sports Medicine’s Team Physician Course</u> San Diego Princess Resort San Diego, California</p>
02/06/98	<p>“Concussion: Definition, Classification, and Return to Play” <u>American College of Sports Medicine’s Team Physician Course</u> San Diego Princess Resort San Diego, California</p>
02/06/98	<p>“Problems and Perils in On-field Management of Head and Neck Injury” Hands-on Exam Workshop <u>American College of Sports Medicine’s Team Physician Course</u> San Diego Princess Resort San Diego, California</p>
02/06/98	<p>“Physical Examination of the Cervical Spine” Hands-on Exam Workshop <u>American College of Sports Medicine’s Team Physician Course</u> San Diego Princess Resort San Diego, California</p>
01/31/98	<p>“Concussion/Closed Head Trauma/Convulsions” Panel Discussion <u>The Jockey Club/Concussion and Head in Sport</u> The Gloucester Hotel Harrington Gardens London, England</p>
01/30/98	<p>“Concussion in Sport and the Second Impact Syndrome” <u>The Jockey Club/Concussion and Head in Sport</u> The Gloucester Hotel Harrington Gardens London, England</p>
10/18/97	<p>“The On-Field Management of Athletic Head and Spine Injuries” ACC Keynote Address <u>New Zealand Sports Medicine Partners In Performance Conference</u> Millennium Hotel Christchurch, New Zealand</p>
10/18/97	<p>“Second Impact Syndrome:” ACC Keynote Address <u>New Zealand Sports Medicine Partners in Performance Conference</u> Millennium Hotel Christchurch, New Zealand</p>

10/17/97 “When To Return to Collision Sports After Concussion”
ACC Keynote Address: Tom Anderson Trust Lecture
New Zealand Sports Medicine Partners in Performance Conference
Millennium Hotel
Christchurch, New Zealand

10/16/97 “The Return to Sport After Cervical Spine Injury”
Sports Physician Day
New Zealand Sports Medicine Partners in Performance Conference
Millennium Hotel
Christchurch, New Zealand

10/14/97 “Catastrophic Sports Injuries”
New Zealand Sports Medicine Conference
Hawkes Bay Chapter
Hawkes Bay, New Zealand

10/14/97 “Second Impact Syndrome”
Grand Rounds Presentation
Napier Hospital
Napier, New Zealand

10/13/97 “When to Return to Competition After Head and Spine Injury”
New Zealand Sports Medicine Conference
Whangarei, New Zealand

09/25/97 “Athletic Head Injury Guidelines”
New England American College of Sports Medicine: Fall Meeting
Rhode Island Convention Center
Providence, R.I.

05/22/97 “Head Injury In Football”
American College of Sports Medicine: Annual Meeting
Denver, Colorado

05/01/97 “Should There Be An Age Limit in Boxing”
WBC: First Medical Conference on Boxing Safety
Aruba

03/14/97 “Head Injury in Boxing”
Ringside Physician Course
Colorado Springs, Colorado

02/10/97 “Concussion Guidelines: Controversies and Implementation”
Allegheny General Hospital Sports Medicine Meeting
Caribe Royale Resort
Lake Buena Vista, Florida

01/12/97 “Neurological Injuries and the Athlete”
Breakfast Seminar
AANS 65th Annual Meeting
Colorado Convention Center
Denver, Colorado

11/22/96	<p>“Catastrophic Head Injury” <u>Oklahoma Spine Institute</u> Oklahoma City, Oklahoma</p>
11/08/96	<p>“Head and Face Protection for the Athlete” <u>New England American College of Sports Medicine: Fall Meeting</u> Boxboro, MA</p>
10/26/96	<p>“Ask the Experts” Fitness and Beauty Cruise Norwegian Cruise Line</p>
10/23/96	<p>“Weekend Warrior Woes” Fitness and Beauty Cruise Norwegian Cruise Line</p>
10/22/96	<p>“Exercise for Health versus Fitness” Fitness and Beauty Cruise Norwegian Cruise Line</p>
10/02/96	<p>“Head Injury and the Athlete” <u>Pediatric Day Conference</u> Waterbury, CT</p>
06/01/96	<p>“Boxing and Medicine” <u>American College of Sports Medicine: Annual Meeting</u> Cincinnati, OH</p>
05/31/96	<p>“On-the-Field Evaluation of Head and Neck Injuries” Clinical Workshop <u>American College of Sports Medicine: Annual Meeting</u> Cincinnati, OH</p>
05/31/96	<p>“Positive and Negative Effects of Head Protection” NCAA Colloquium <u>American College of Sports Medicine: Annual Meeting</u> Cincinnati, OH</p>
05/29/96	<p>“Management of Head and Neck Injuries” <u>American College of Sports Medicine: Annual Meeting</u> Cincinnati, OH</p>
5/18/96	<p>“Head and Neck Injuries in Sports: Assessment in On-The-Field Management” Sports Medicine For The Rheumatologist <u>American College of Rheumatology</u> Phoenix, AZ</p>
4/27/96	<p>“Diffuse Brain Injuries”; “Spinal Stenosis, Cord Neuropraxia, Transient Quadriplegia”; “Athletic Injuries of the Head and Neck” <u>The William W. Backus Hospital Trauma Department Program</u> Foxwoods Resort Casino, CT</p>

03/14/96 “Boxing Injuries”
 Emory University School of Medicine
 Summer Games: Sports Medicine Review
 Atlanta, GA

02/09/96 “Concussion: Definition, Classification, and Return to Play”;
 “Epilepsy and Sports Participation”;
 “Cervical Spine Injury, Extra Axial Facet, Disk, Radicular
 Symptoms, and Transient Quadriparesis”;
 “Neurologic and Vascular Causes of Upper Extremity Problems
 (Cervical Spine, Stringers, Peripheral Nerve, Brachial Plexus, Thoracic Outlet)”;
 “Hands-on Workshop - Physical Examination of the Spine”
 American College of Sports Medicine: Team Physician Course - Part I
 San Diego, CA

01/27/96 “Strength Aerobics - The Next Stage in Personal Fitness”
 McKenzie Speaker
 Sports Injuries Update
 Lake Placid Sports Medicine Society Conference
 Lake Placid, NY

01/26/96 “Epidemiology and Pathophysiology of Athletic Head Injury”
 “Acute Assessment of Athletic Head and Neck Injuries”
 “Surgical Treatment of Athletic Head and Spine Injuries:
 Who can Safely Return to Competition”
 Sports Injuries Update
 Lake Placid Sports Medicine Society Conference
 Lake Placid, NY

01/25/96 “Athletic Neck and Cervical Spine Trauma”
 Albany Medical College
 Albany, NY

01/07/96 “Second Impact Syndrome”
 Eastern Athletic Trainers Association Annual Meeting
 Boston, MA

12/14/95 “Catastrophic Head and Neck Injury in Sports”
 “Evaluation of Current Guidelines for Head Injury in Sports”
 “General Spinal Stenosis in Contact Sports”
 Rehabilitation Sports Medicine VIII: Controversies in Sports Medicine.
 The Rehabilitation Institute of Chicago
 Chicago, IL

11/09/95 “Strength Aerobics”
 Walden Rehabilitation & Nursing Center
 Concord, MA

10/23/95 “Weekend Warrior Woes: How to Avoid Exercise Injuries”
 Fitness and Beauty Cruise
 Norwegian Cruise Line

- 10/22/95 “Exercise for Health vs Fitness (How Much is Enough?)”
Fitness and Beauty Cruise
Norwegian Cruise Line
- 10/13/95 “Closed Head Injury”
“Transient Quadriplegia in Sports”
Together in College Health: Surviving and Thriving
Combined Annual Meeting: New York State Health Association and New England College
Health Association
Tarrytown, NY
- 10/11/95 “Catastrophic Sports Injuries: Functional Spinal Stenosis”
“Sudden Death Syndrome”
Emerson Hospital Neurology Conference
Concord, MA
- 08/24/95 “Torso and Genitourinary Tract Injuries”
Medicine in the Last Frontier/Medical World Conference
Alaska
- 08/24/95 “A Team Physician’s Sports Medicine Bag”
Medicine in the Last Frontier/Medical World Conference
Alaska
- 08/21/95 “Sports Injuries in Young Athletes”
Medicine in the Last Frontier/Medical World Conference
Alaska
- 08/21/95 “How to Write a Precise Aerobic Exercise Prescription”
Medicine in the Last Frontier/Medical World Conference
Alaska
- 08/20/95 “Conditioning of Cardiovascular System: A Machiavellian Approach to Health”
Medicine in the Last Frontier/Medical World Conference
Alaska
- 06/14/95 “Guidelines for Return to Competition After Mild Brain Injury in Sports”
National Athletic Trainers’ Association
Indianapolis, IN
- 06/02/95 “On-The-Field Evaluation of Head and Neck Injuries”
Clinical Workshop
American College of Sports Medicine: Annual Meeting
Minneapolis, MN
- 05/23/95 “Trauma to the Head and Spine”
Connecticut Athletic Trainers’ Association
New Britain, CT
- 05/13/95 “Cervical Radiculopathy - Painless vs. Painful: A Conceptual Model and
Management Approach”
1st Annual Combined Meeting - Puget Sound & Portland Spine Interest Groups
Seattle, WA

05/07/95 “Current Treatment Recommendations for Concussions and
the Burner Syndromes”
Prevention and Management of High School Football Injuries
Salem Orthopedic Surgeons, Inc.
Waltham, MA

04/28/95 “Management of Sports-Related Spine Injuries”
Keynote Address
Contemporary Management of Lumbar Spine Disorders
The NeuroScience Institute at Mercy
Oklahoma City, OK

04/23/95 “Assessment of Acute and Repetitive Head Injuries”;
“Management of Cervical Injuries”
Clinical Congress: Decision Making and Sports Injuries
Braintree Hospital Rehabilitation Network
Randolph, MA

04/21/95 “Return to Play Criteria After Cervical Spine Injury”
“Cervical Spine Injuries Workshop: Case Studies and Discussion”
Controversies in Decision Making: Neurological Sports Injuries
University of Miami School of Medicine
Lake Buena Vista, FL

04/01/95 “Exercise for Health vs Fitness”
Mens Health Day
Emerson Hospital
Concord, MA

03/03/95 “Catastrophic Injury of the Brain and Spinal Cord”
Ninth Annual Neurologically Impaired Individual Symposium
St. Mary’s Hospital
Richmond, VA

02/21/95 “Head Injuries”
Department of Physical Medicine & Rehabilitation
Resident Didactic Seminars
Tufts University School of Medicine
Newton Wellesley Hospital
Natick, MA

02/15/95 “Chest and Abdominal Injuries”
Sports Medicine: An In-Depth Review
American Academy of Family Physicians
Dallas, TX

02/14/95 “Closed Head Injuries”
“Entrapment Neuropathies”
“Spine: History and Exam Skills Workshop”
Sports Medicine: An In-Depth Review
American Academy of Family Physicians
Dallas, TX

- 01/25/95 “Athletic Head and Spine Injuries: Recognition of
On-The-Field Care and Return to Play Guidelines”
Sports Medicine Symposium 1995
North Broward Medical Center
Pompano Beach, FL
- 12/07/94 “The Prevention of Sports Related Neurological Injuries in American Football: Rules,
Equipment, and Surfaces”;
“Guidelines for Return to American Football
After an Episode of Transient Quadriplegia”
American Society for Testing and Materials Symposium on Safety in American Football
Phoenix, AZ
- 11/19/94 “Prevention, Treatment, and Return to Play Criteria for Head & Neck Injuries in Sports”
“ACSM and the Sports Medicine Professional”
Greater New York Regional Chapter American College-of-Sports Medicine
New York, NY
- 11/04/94 “When to Return to Contact Collision Sports After an Episode of Transient Quadriplegia”
New England Chapter American College of Sports Medicine
Boxborough, MA
- 09/14/94 “Spinal Stenosis”
Emergency Department Medical Staff Conference
Emerson Hospital
Concord, MA
- 06/11/94 “Assessment and Treatment of Traumatic Cervical Spine/Cord Injury”
“Guidelines for Return to Contact Collision Sports After Traumatic Cervical
Spine/Cord Injury”
National Athletic Trainers Association Annual Meeting and Clinical Symposium
Dallas, TX
- 06/04/94 “On-the-Field Evaluation and Management of Head and Spinal Cord Injury”
American College of Sports Medicine: Annual Meeting
Indianapolis, IN
- 06/03/94 “Concussion: Management and Return to Competition”
American College of Sports Medicine: Annual Meeting
Indianapolis, IN
- 06/02/94 “Traumatic Fatal and Non-Fatal Catastrophic Sports Injuries”
American College of Sports Medicine: Annual Meeting
Indianapolis, IN
- 06/02/94 “Cervical Spinal Stenosis and Contact Sports”
American College of Sports Medicine: Annual Meeting
Indianapolis, IN
- 05/20/94 “Return to Sport After Head Injury”
“Head and Neck Injuries”
“The Preparticipation Examination”

Caribbean Sports Medicine Congress
Bridgetown, Barbados, WI

- 04/17/94 “Cerebral Concussion in Sport: Prevention and Management”
Mild Brain Injury Summit National Athletic Trainers Association
Washington, D.C.
- 03/23/94 “Neck Injuries: The Great Debate: Personal Experience and Perspectives of Our Experts”
Panelist: Neck Injuries Workshop Case Studies and Discussion
Controversies in Decision Making: Neurological Sports Injuries
University of Miami School of Medicine and the Miami Project to Cure Paralysis
Lake Buena Vista, FL
- 03/22/94 “Catastrophic Sports Injuries: Which Sports Are at Greatest Risk and Why”
“When to Return to Contact/ Collision Sports After Head and Spine Injury”
16th Annual Family Practice Review
Bayfront Medical Center
St. Petersburg Beach, FL
- 03/21/94 “When is it Safe to Return to Contact Sports?”
Panelist: Head Injury Workshop - Case Studies and Discussion
Controversies in Decision Making: Neurological Sports Injuries
University of Miami School of Medicine and the Miami Project to Cure Paralysis
Lake Buena Vista, FL
- 03/20/94 “Prevention of Sports-Related Neurological Injuries: Rules, Equipment, and Surfaces,”
Moderator: Peripheral Nerve Injuries Workshop - Case Studies and Discussion
Controversies in Decision Making: Neurological Sports Injuries
University of Miami School of Medicine and the Miami Project to Cure Paralysis
Lake Buena Vista, FL
- 03/12/94 “Acute and Second Impact Syndrome Head Injury”
First Annual Ringside Physicians Course
United States Amateur Boxing, Inc.
Colorado Springs, CO
- 03/08/94 “Health Benefits of Physical Fitness,”
Second Annual New Dimensions in Research Conference
Mabon Securities Corporation
Beaver Creek, CO
- 03/05/94 “Managing Head and Neck Injuries”
Sports Med Boston: “New Options for Treating the Injured Athlete”
Back Pain Society
Danvers, MA
- 01/21/94 “Neck Injuries”
Sport Med 94
Toronto, Canada
- 01/21/94 “Head Injuries in Sport”
The Tom Pashby Sport Safety Fund Lecture
Sport Med 94
Toronto, Canada

- 11/19/93 “When is it Safe to Return to Contact Sports After a Head Injury”
American Medical Tennis Association Omni Specialty Sports Medicine Update
Palm Springs, CA
- 11/18/93 “When is it Safe to Return to Contact Sports After a Cervical Spine Injury?”
American Medical Tennis Association Omni Specialty Sports Medicine Update
Palm Springs, CA
- 11/09/93 “The Female Triad: Disordered Eating, Amenorrhea, and Osteoporosis”
Community Health Education Program
Emerson Hospital
Concord, MA
- 09/06/93 “Head and Neck Injury”
XVth World Congress of Neurology
Vancouver, B.C., Canada

- 08/14/93 “Epidemiology, Recognition and Acute Management of Closed Head Injury/ Concussion”
 “Return to Competition After Head Injury”
 “Fractures and Dislocations of Cervical Spine”
 “Epidemiology, Evaluation and Treatment of Traumatic Spinal Cord Injury:
 Return to Competition”
 “Case Presentations: Transient Quadriplegia”
ACSM CAQ Board Review Course for the Certification Examination
in Sports Medicine
 San Francisco, CA
- 08/13/93 “Functional Anatomy & Biomechanics:
 Examination of the Patient with Low Back Pain”
 “Lumbar Spinal Stenosis: Dx and Management”
 “Indications for Surgery and Return to Competition After Lumbar Spine Injury”
 “Legal Aspects of Sports Medicine and Role of the Team Physician”
 “On-field Management and Evaluation of Acute Spinal Cord Trauma”
ACSM CAQ Board Review Course for the Certification Examination
in Sports Medicine
 San Francisco, CA
- 06/11/93 “Case Studies: Epidemiology, Assessment, and Return to Play Criteria
 for Head Injuries in Sports”
National Athletic Trainers Association Annual Meeting and Clinical Symposium
 Kansas City, MO
- 06/05/93 “Spinal Stenosis: Transient Quadriplegia and Football”
40th Annual Meeting American College of Sports Medicine
 Seattle, WA
- 06/03/93 “Physician Continuing Medical Education and Opportunities”
Symposium: 40th Annual Meeting American College of Sports Medicine
 Seattle, WA
- 05/20/93 “Where is Boxing in This Process?”
International Symposium on Head and Neck Injuries in Sports American Society for Testing
and Materials
 Atlanta, GA
- 05/14/93 “Sports Medicine in Primary Care”
 “Athletic Catastrophic Sports Injury Study (1931-1987):
 Which Sports Are at Greatest Risk and What is Being Done to Reduce Injury”
 “Medical Coverage of Games and Events”
 “Legal Liabilities of the Team Physician”
 “How to Live Painlessly With Your Low Back Disorder”
Fourth Annual Sports Medicine Conference on the Beach Halifax Medical Center Family Practice
Residency Program
 Daytona Beach, FL
- 05/07/93 “Women’s Triad”
 Conference Chairman
Eighth Annual Sports Medicine Update 93
 Westford, MA

05/06/93 “Returning to Contact Sports After a Head Injury:
Relative and Definite Contraindications”
Department of Pediatrics, Emerson Hospital
Concord, MA

04/15/93 “The Prevention and Treatment of Athletic Spine Injuries”
Grand Rounds
Nashua Memorial Hospital, NH

03/06/93 “Specific Problems and Pearls in Boxing”
“Indications for Surgery and Return to Competition After Lumbar Spine Injury”
Team Physician Course Parts II and III: American College of Sports Medicine
Orlando, FL

03/05/93 “Transient Quadriplegia (Symptoms, Pathomechanics, Work-up, Return to Play,
Controversies, Case Presentations and Discussion)
(With Stanley A. Herring, M.D.)
Team Physician Course Part III: American College of Sports Medicine
Orlando, FL

03/04/93 “Brachial Plexus Injuries”
“Epidemiology, Recognition, and Acute Management of Head Injuries”
“Return to Play Criteria After Head Injury”
“Epilepsy and the Athlete”
Team Physician Course Part II and III: American College of Sports Medicine
Orlando, FL

03/02/93 “Toward a Lifetime of Family Fitness”
Health and Fitness in the 90’s
The Thoreau Club of Concord
Concord, MA

02/23/93 “Legal Liabilities of the Team Physician”
Omni Specialty Sports Medicine Update American Medical Tennis Association
Scottsdale, AZ

02/22/93 “Epilepsy and the Athlete”
Omni Specialty Sports Medicine Update American Medical Tennis Association
Scottsdale, AZ

01/29/93 “Catastrophic Sports Injuries: Which Sports are at Greatest Risk and Why?”
Southeast Regional Chapter: American College of Sports Medicine
Norfolk, VA

01/29/93 “Medical Risks of Boxing/Is Boxing a Sport?”
Southeast Regional Chapter: American College of Sports Medicine
Norfolk, VA

01/25/93 “Head and Spine Injuries in Athletes”
Chelmsford High School
Chelmsford, MA

01/23/93 “Head and Neck Injuries in Athletes”
Comprehensive Review Course in Sports Medicine
The College of Physicians and Surgeons
Department of Orthopaedic Surgery
Columbia University, New York
Barbados, West Indies

01/12/93 “Women’s Health Issues: Ask the Doctor”
Health and Fitness in the 90’s
The Thoreau Club of Concord
Concord, MA

12/23/92 “Overview of Head Injuries in the Athlete,”
St. Vincent Hospital Grand Rounds
Worcester, MA

11/18/92 “Head and Neck Injury Reduction in Football: A Sixty-Year Effort”
American Medical Tennis Association
Palm Springs, CA

11/13/92 “Low Back Pain: Etiology, Diagnosis, and Treatment”
“Spinal Cord Injuries”
American Academy of Family Physicians 6th Annual Family Practice Weekend & Sports
Medicine Conference
Huntington, WV

11/10/92 “Exercise: What’s the Right Dosage for You?”
Health and Fitness in the 90’s
The Thoreau Club of Concord
Concord, MA

10/14/92 “Cervical Spine Injuries”
Australian College of Sports Physicians: National Annual Scientific Conference in
Sports Medicine
Perth, Western Australia

10/13/92 “The Team Physician”
Australian College of Sports Physicians: National Annual Scientific Conference in
Sports Medicine
Perth, Western Australia

10/12/92 “Catastrophic Sports Injuries”
Keynote Address
Australian College of Sports Physicians: National Annual Scientific Conference in
Sports Medicine
Perth, Western Australia

10/06/92 “Signs and Symptoms of Anabolic Steroid Abuse”
Commonwealth of Massachusetts
Project Alliance Training Program
Burlington, MA

08/22/92 “Back Injuries in Tennis Players”
 Society of Tennis Medicine and Science
 Yale University
 New Haven, CT

07/23/92 “Fitness for Good Health”
 Concord Prison Outreach
 Concord, MA

06/05/92 “Serious Head and Neck Injury Reduction in Football - A 60-Year Effort”
 New England Neurosurgical Society.
 Waltham, MA

05/29/92 “Head Injury in Sports”
 39th Annual Meeting American College of Sports Medicine
 Dallas, TX

05/28/92 “Team Physician Certification,”
 39th Annual Meeting American College of Sports Medicine
 Dallas, TX

05/27/92 “Head, Neck, and Spine: Head and Neck Injury”
 Chair: Physician Case Presentations
 39th Annual Meeting American College of Sports Medicine
 Dallas, TX

05/13/92 “Steroid Abuse in the Athlete”
 Spring Symposium on Sports Medicine
 Milford Whitinsville Regional Hospital
 Milford, MA

05/01/92 “The Anabolic Steroid Epidemic”
 7th Annual Sports Medicine Update 92
 Westford, MA

04/14/92 “Disc Herniation in the Athlete: When to Operate?”;
 “On-field Emergencies to the Spine and Neck”
 The National Sportsmedicine Conference ‘92
 Orlando, FL

03/11/92 “Steroids - The Threat and Dangers,”
 Assabet Valley Regional Vocational School
 Marlborough, MA

02/26/92 “Lumbar Spinal Stenosis: Evaluation and Treatment”
 Leominster Hospital Grand Rounds
 Leominster, MA

02/24/92 “Head Trauma in Adolescents”
 Medical Student Education
 Emerson Hospital
 Concord, MA

- 02/02/92 “Sports Medicine-Sports Science: Bridging the Gap”;
 “Head, Neck, and Extrapapinal Nerve Injury in Contact Sports”;
 “Acute and Chronic Brain Injuries in Boxing and Other Collision Sports”;
 “Return to Collision Sports After Athletic Cervical and Lumbar Spine Injury”
Third National Kaiser Permanente Sports Medical Conference
 Snowbird, UT
- 01/13/92 “Steroids - The Threat and Dangers”
Marlborough High School Athletic Department
 Marlborough, MA
- 12/14/91 “Epidemiology, Assessment, and Criteria for Return to Play in Cervical Spine Injuries”;
 “Epidemiology, Assessment, and Return to Play Criteria for Head Injuries in Sports”
Rehabilitation Sports Medicine IV: Injuries to the Head and Neck in Sports
 Rehabilitation Institute of Chicago
 Chicago, IL
- 12/04/91 “Steroids - The Threat and Dangers”
Sports Injury Symposium: The Massachusetts Interscholastic Athletic Association
 Waltham, MA
- 11/22/91 “Anabolic Steroid Abuse in Athletics”
American Medical Tennis Association
 Palm Springs, CA
- 11/21/91 “Catastrophic Sports Injuries in High School and College Sports”
American Medical Tennis Association
 Palm Springs, CA
- 10/22/91 “Catastrophic Sports Injuries: Which Sports Are at Greatest Risk and What is Being Done to
 Reduce Injury”
 Harvard Community Health Plan
 Wellesley, MA
- 10/19/91 “Etiology, Biomechanics, Diagnosis, and Treatment of Athletic Low Back Pain”
 University of Texas Health Center
 Tyler, TX
- 10/18/91 “Etiology, Biomechanics, Diagnosis, and Treatment of Athletic Low Back Pain”
 Tom Landry Sports Medicine Center
 Dallas, TX
- 10/18/91 “Catastrophic Sports Injuries: Which Sports Are at Greatest Risk and What is Being Done to
 Reduce Injury”
 Texas College of Osteopathic Medicine
 Fort Worth, TX
- 10/17/91 “Catastrophic Sports Injuries: Which Sports Are at Greatest Risk and What is Being Done to
 Reduce Injury”
 Texas A&M University
 College Station, TX

10/17/91	<p>“Etiology, Biomechanics, Diagnosis, and Treatment of Athletic Low Back Pain” Texas Woman’s University Houston Center, TX</p>
10/10/91	<p>“Head and Spine Injuries in Athletes” Maine Medical Center Portland, ME</p>
09/27/91	<p>“Catastrophic Sports Injuries: Sports at Risk?” <u>Medical Staff Clinical Meeting</u> Emerson Hospital Concord, MA</p>
09/08/91	<p>“Catastrophic Spinal Injuries in Scholastic Sports” <u>American Academy of Neurological and Orthopaedic Surgeons Fifteenth Annual Scientific Convention</u> Las Vegas, NV</p>
09/07/91	<p>“The Boxing Controversy: A Neurosurgeon’s Perspective” <u>American Academy of Neurological and Orthopaedic Surgeons Fifteenth Annual Scientific Convention</u> Las Vegas, NV</p>
09/07/91	<p>“When To Return to Collision Sports After Athletic Head and/or Cervical Spine Injury” <u>American Academy of Neurological and Orthopaedic Surgeons Fifteenth Annual Scientific Convention</u> Las Vegas, NV</p>
09/06/91	<p>“Catastrophic Spine Injuries in Scholastic Sports: Which Are at Greatest Risk and What is Being Done to Reduce Injury” 1991 Presidential Guest Lecturer <u>American Academy of Neurological and Orthopaedic Surgeons Fifteenth Annual Scientific Convention</u> Las Vegas, NV</p>
07/27/91	<p>“Low Back Pain: Etiology, Diagnosis, and Treatment” The Burdenko Water and Sports Therapy Institute Boston, MA</p>
07/27/91	<p>“Catastrophic Spine Injuries in All School Sports” <u>American Academy of Sports Physicians</u> Boston, MA</p>
06/12/91	<p>“Health Effects of Regular Exercise” Concord Prison Outreach Concord, MA</p>
06/07/91	<p>“Acute and Chronic Brain Injury in Contact Sports”; “Evaluation of the Athlete for Return to Sports After Concussion” <u>Snake River Medical Forum</u> Lewiston, ID</p>

06/01/91 “Boxing - A Historical Perspective”;
 “Professional Boxing - One Neurosurgeon’s Viewpoint”
American College of Sports Medicine Annual Meeting
 Orlando, FL

05/31/91 “Criteria For Return to Play Following Cervical Injuries”
American College of Sports Medicine Annual Meeting
 Orlando, FL

05/17/91 “Carotid Artery Stenosis”
Medical Staff Clinical Scientific Meeting
 Emerson Hospital
 Concord, MA

05/07/91 “Sports Injuries”
Milford Regional Hospital Grand Rounds
 Milford, MA

05/03/91 “When to Return to Competition after Head and Cervical Spine Injury”;
 “Anatomy, Biomechanics, Diagnosis, and Management of Athletic Low Back Pain”
Sixth Annual Sports Medicine Update 91
 Westford, MA

05/02/91 “Life-threatening Injuries to the Head and Neck”
Minnesota Academy of Family Physicians
 Minneapolis, MN

04/24/91 “Catastrophic Spine Injuries in All School Sports (1982-1989)”
American Association of Neurological Surgeons
 New Orleans, LA

04/12/91 “Low Back Pain: Etiology, Diagnosis, and Treatment”
National Sports Medicine Conference On The Beach
 Halifax Medical Center
 Family Practice Residency Program
 Daytona Beach, FL

03/26/91 “Recognition and Management of Head Injuries”;
 “Peripheral Nerve Entrapment”
American College of Sports Medicine Team Physician Course
 Orlando, FL

03/24/91 “Cord and Peripheral Nerve”;
 “Spinal Stenosis: How to Evaluate”;
 “On-the-Field Management of Acute Spinal Cord Injury”
American College of Sports Medicine Team Physician Course
 Orlando, FL

03/14/91 “Catastrophic Sports Injuries in High School and College Sports”
Massachusetts Association for Health, Physical Education, Recreation and Dance,
 1991 Annual Convention
 Randolph, MA

02/11/91 “Anatomy and Biomechanics of Athletic Cervical Spine & Head Injury”;
“Intraspinal and Extraspinal. Cervical Spine Injuries - Diagnosis and Management”
Second National Kaiser Permanent Sports Medicine Conference
Snowbird, UT

02/10/91 “Anatomy, Biomechanics, Diagnosis and Management of Low Back Pain”
Second National Kaiser Permanent Sports Medicine Conference
Snowbird, UT

02/01/91 “Spinal Stenosis: Identification and Therapy,”
Medical Staff Scientific Meeting
Emerson Hospital
Concord, MA

01/10/91 “Lumbar Spinal Stenosis: Evaluation and Treatment/ Surgical Indications”
Buffalo General Hospital Grand Rounds
Buffalo, NY

01/10/91 “Diabetes and Exercise”
Mercy Hospital Grand Rounds
Buffalo, NY

01/09/91 “How to Live Painlessly With Your Low Back Disorder”
South Town Physicians
Blasdell, NY

12/04/90 “Feeling Fit for Life”
Community Health Lecture Series
Emerson Hospital
Concord, MA

11/30/90 “Catastrophic Sports Injuries in High School and College Athletes”
American Medical Tennis Association
Palm Springs, CA

11/29/90 “Sports Medicine in Primary Care”
American Medical Tennis Association
Palm Springs, CA

11/26/90 “Neurologic Injuries: Assessment/Care at Scene of Injury”
Littleton Fire Department - EMT
Littleton, MA

11/17/90 “Epidemiology of Head Injuries in Sports and Return to Play Decision Making”
Swedish Hospital Medical Center
Spine Institute Fall Symposium
Seattle, WA

11/16/90 “Epidemiology of Spinal Cord Injuries and Assessment of Intraspinal Injuries in Sports”
Swedish Hospital Medical Center
Spine Institute Fall Symposium
Seattle, WA

11/07/90	“Steroid Abuse in the Athlete”; “Cranial and Cervical Injuries in Sports” Hahnemann. University School of Medicine Philadelphia, PA
11/03/90	“Sports Injuries to the Lower Extremities” <u>Nurse Practitioner Associates for Continuing Education National Primary Care Conference</u> Boston, MA
10/22/90	“Neurosurgical Athletic Injuries” <u>Congress of Neurological Surgeons</u> Los Angeles, CA
10/16/90	“Osteoarthritis Due to Sports-related Injuries” <u>Framingham Union Hospital Grand Rounds</u> Framingham, MA
10/12/90	“Sports Injuries and Low Back Pain” <u>Bethany Medical Conference</u> Bethany Medical Center Kansas City, KS
10/12/90	“Sports Injuries” Trinity Lutheran Hospital Kansas City, MO
10/11/90	“Prevention and Treatment of Catastrophic Sports Injuries” Kansas University Medical Center; Kansas City, MO
10/11/90	“Arthritic Low Back Pain” Topeka Veterans Administration Hospital Topeka, KS
10/11/90	“Low Back Pain - Management and Exercise of Diabetic Patients” Providence - St. Margaret’s Hospital Kansas City, KS
10/11/90	“How to Live Painlessly with Arthritic Low Back Pain” Shawnee Mission Medical Center Overland Park, KS
07/25/90	“Sports Medicine and Primary Care” <u>Omni Specialty Sports Medicine Update American Medical Tennis Association</u> Waterville Valley, NH
07/24/90	“Anabolic Steroid Abuse in Athletics” <u>Omni Specialty Sports Medicine Update American Medical Tennis Association</u> Waterville Valley, NH

07/23/90 “Catastrophic Sports Injuries in High School and College Sports”
Omni Specialty Sports Medicine Update American Medical Tennis Association
 Waterville Valley, NH

07/14/90 “Management of Osteoarthritic Sports Injuries”
 Health-in-Action Day
 Stratton Mountain, VT

07/11/90 “Health Benefits of Exercise”
 New England Correctional Center
 Concord, MA

05/24/90 “Intracranial Athletic Cervical Spine Injury”
 Symposium Co-chairman: Athletic Cervical Spine Injury
American College of Sports Medicine Annual Meeting
 Salt Lake City, UT

05/24/90 “On-the-Field Evaluation of Head and Spine Injuries”
 Clinical Workshop
American College of Sports Medicine Annual Meeting
 Salt Lake City, UT

05/23/90 “Neck Pain - Soccer”
American College of Sports Medicine Annual Meeting
 Salt Lake City, UT

05/23/90 “On-the-Field Evaluation of Head and Spine Injuries”
 Clinical Workshop
American College of Sports Medicine Annual Meeting
 Salt Lake City, UT

05/22/90 “Head Injuries in Sports: Biomechanics, Prevention, and Treatment”
 Clinical Lecture
American College of Sports Medicine Annual Meeting
 Salt Lake City, UT

05/07/90 Medical Resource for Breakout Medical Session
National Catastrophic Head/Spinal Cord Sports Injury Consensus Meeting
 National Federation of State High School Associations
 Kansas City, MO

05/04/90 “Catastrophic Sports Injuries”
 Conference Chairman
Sports Medicine Update 90
 Westford, MA

04/30/90 “The Athlete and the Neurosurgeon”
 Breakfast Seminar Panel Chairman
American Association of Neurological Surgeons
 Nashville, TN

04/23/90 “Diagnosis, Prevention, and Treatment of Athletic Spine Injuries”
 Kaiser Permanente HMO
 Holyoke, MA

04/18/90	"Burners/ Stingers /Cervical Spine Injuries"; "Concussions" <u>First Annual Sports Medicine Conference on the Beach</u> Halifax Medical Center Family Practice Residency Program Daytona Beach, FL
04/06/90	"Sports Medicine: Bridging the Gap" Penobscot Bay Medical Center Rockland, ME
04/05/90	"Low Back Pain: Etiology, Diagnosis, and Treatment" Eastern Maine Medical Center Bangor, ME
03/30/90	"Cervical and Low Back Pain: Diagnosis and Treatment" St. Vincent Hospital Family Practice Residency Program Erie, PA
03/30/90	"Catastrophic Sports Injuries" Hamot Family Practice Erie, PA
03/30/90	"Low Back Pain: Etiology, Diagnosis, and Treatment" Millcreek Community Hospital Erie, PA
03/29/90	"Low Back Pain: Etiology, Diagnosis, and Treatment" Aviation Country Club Erie, PA
03/23/90	"Low Back Pain: Etiology, Diagnosis, and Treatment" Hanscom Clinic - Hanscom Field Air Force Base Bedford,MA
02/09/90	"Catastrophic Football Spine Injuries; 1977-1988" <u>Joint Section on Disorders of the Spine and Peripheral Nerves</u> <u>American Association of Neurological Surgeons</u> Captiva Island, FL
02/03/90	"The Neurosurgeon and the Amateur Athlete" <u>Downeast Association of Physician Assistants Winter Conference</u> Bethel, ME
01/12/90	"Exercise for Health vs Fitness: How much is enough?" <u>Community Health Lecture Series</u> Emerson Hospital Concord, MA
10/24/89	"Adolescents and Anabolic Steroids" <u>Pediatric Grand Rounds</u> Baystate Medical Center Springfield, MA

10/17/89 “Prevention and Treatment of Spinal Injuries in Athletes”
St. Francis Health Care Foundation Endowed Lecture Series
St. Francis Hospital
Poughkeepsie, NY

10/04/89 “Steroids - The Threat and Dangers”
Massachusetts Interscholastic Athletic Association, Inc Annual Sports Injury Conference
Milford, MA

09/23/89 “Indications/ Contra-Indications For Surgery in the Arthritic Patient”
Health-in-Action Day
Nova Scotia, Canada

09/16/89 “Rehabilitation at Fitness Centers”
Sponsored by Nautilus Sports Medical Industries, Inc.
Vista International Hotel
Elizabeth, NJ

07/25/89 “Anabolic Steroid Abuse in Athletics”
Omni Specialty Sports Medicine Update American Medical Tennis Association
Waterville Valley, NH

07/24/89 “Catastrophic Sports Injuries in High School and College Sports”
Omni Specialty Sports Medicine Update American Medical Tennis Association
Waterville Valley, NH

06/13/89 “Case Presentations”
Monroe County Highland Hospital Grand Rounds
Rochester, NY

06/13/89 “Cervical and Low Back Spine”
Monroe County Highland Hospital Grand Rounds
Rochester, NY

06/12/89 “Cervical and Low Back Spine”
Sponsored by Monroe County Highland Hospital Physicians Assistants
Pittsford, NY

06/10/89 “Low Back Pain: Etiology, Diagnosis, and Treatment”
Sheehan Memorial Hospital
Buffalo, NY

06/10/89 “Low Back Pain: Etiology, Diagnosis, and Treatment”
Our Lady of Victory Hospital Grand Rounds
Lackawanna, NY

06/05/89 “Sports Medicine in Primary Care”
Williamsville, NY

06/05/89 “Sports Medicine in Primary Care”
Niagara Falls Memorial Hospital
Niagara Falls, NY

05/05/89 “Steroid Abuse in Athletics”
 Sports Medicine Update 89
 Westford, MA

04/28/89 “Cervical and Lumbar Osteoarthritis,”
 St. Anne’s Hospital Grand Rounds
 Fall River, MA

04/24/89 “Medical Management of Low Back Pain”
 Hunt Memorial Hospital
 Danvers, MA

04/12/89 “Nutrition and Exercise For the Senior Citizen”
 Trinitarian Church
 Concord, MA

04/10/89 “Prevention and Treatment of Athletic Spine Injuries”
 Sponsored by Cooley Dickinson Hospital
 Northampton, MA

03/17/89 “Chronic Low Back Pain”
 St. John’s Hospital Grand Rounds
 Lowell, MA

03/16/89 “Low Back Pain: Etiology, Diagnosis, and Treatment”
 Mercy Hospital
 Buffalo, NY

03/16/89 “Prevention and Treatment of Athletic Spine Injuries”
 Millard Fillmore Hospital Grand Rounds
 Buffalo, NY

03/15/89 “Low Back Pain: Etiology, Diagnosis, and Treatment”
 Blasdell, NY

03/02/89 “Common Sports Injuries”
 Youville Hospital
 Cambridge, MA

02/24/89 “Catastrophic Sports Injuries”
 6th Annual Office-Based Sports Medicine Conference
 Sun Valley, ID
 Sponsored by University of California School of Medicine at San Francisco

02/24/89 “When to Return to Contact Sports After a Concussion”
 6th Annual Office-Based Sports, Medicine Conference
 Sun Valley, ID
 Sponsored by University of California School of Medicine at San Francisco

02/24/89 “Athletic Low Back Pain”
 6th Annual Office-Based Sports Medicine Conference
 Sun Valley, ID
 Sponsored by University of California School of Medicine at San Francisco

02/22/89 “Acute and Chronic Brain Injuries in Boxing and Other Collision Sports”
 6th Annual Office-Based Sports Medicine Conference
 Sun Valley, ID
 Sponsored by University of California School of Medicine at San Francisco

02/22/89 “On-the-Field-Management of Athletic Head and Spine Injuries”
 6th Annual Office-Based Sports Medicine Conference
 Sun Valley, ID
 Sponsored by University of California School of Medicine at San Francisco

02/08/89 “Osteoarthritis of the Lumbar Spine”
 New Britain Hospital Grand Rounds
 New Britain, CT

02/08/89 “Sports Medicine In Primary Care”
 Stamford Hospital Grand Rounds
 Stamford, CT

02/07/89 “Feeling Fit After Forty”
 Community Health Lecture Series
 Emerson Hospital
 Concord, MA

02/03/89 “Osteoarthritis of the Lumbar Spine”
 Harvard Community Health Plan
 Braintree, MA

01/20/89 “Catastrophic Injuries in High School and College Athletes”
 The Second International Symposium on the Prevention of
 Catastrophic Sports and Recreational Injuries to the Spine and Head
 Toronto ,Canada

01/19/89 “Head Injuries: The Experience in the United States”
 The Second International Symposium on the Prevention of
 Catastrophic Sports and Recreational Injuries to the Spine and Head
 Toronto, Canada

01/18/89 “Steroid Abuse in Athletics”
 Sports Medicine Symposium Connecticut State Medical Society
 Choate School
 Wallingford, CT

01/17/89 “Catastrophic Sports Injuries”
 Connecticut State Medical Society
 Cheshire, CT

01/11/89 “Diagnosis and Treatment of Degenerative Cervical and Lumbar Spine Disease”
 Henry Heywood Hospital Grand Rounds
 Gardner, MA

01/11/89 “Athletic Low Back Pain”
 Sports Medicine Systems
 Newton, MA

12/20/88	<p>“Low Back Pain” <u>Milford-Whitinsville Regional Hospital Grand Rounds</u> Milford, MA</p>
12/10/88	<p>“Head and Neck Injuries in Sports”; “On-the-Field Management of Head and Neck Injuries” <u>American Physical Therapy Association</u> Hilton Head Island, SC</p>
11/21/88	<p>“Women and Sports - Special Concerns” The Daisy Flour Mill Rochester, NY</p>
11/21/88	<p>“Sports Medicine In Primary Care” <u>Genesee Memorial Hospital Grand Rounds</u> Batavia, NY</p>
11/11/88	<p>“Which Sports Are At Greatest Risk and What Is Being Done”; “Sports Medicine-Sports Science: Bridging the Gap” <u>Kent County Hospital Grand Rounds</u> Warwick, RI</p>
10/28/88	<p>“Osteoarthritis Due To Spinal Injuries” <u>Cutler Army Hospital Grand Rounds</u> Fort Devens, MA</p>
10/07/88	<p>“Health Enhancement Through Physical Conditioning” Concord Fitness Club Concord, MA</p>
10/05/88	<p>“Head and Neck Injuries” <u>Sports Medicine Workshop</u> Buxborough, MA</p>
09/29/88	<p>“Arthritic Low Back Pain” <u>Health-In-Action Day</u> Boston, MA</p>
09/22/88	<p>“Prevention and Recognition of Athletic Head and Spine Injuries” <u>Sports Medicine Update: Prevention and Treatment of Fall Sports Injuries</u> Albany Medical College Albany, NY</p>
09/13/88	<p>“Emergency Care of the Injured Athlete” Littleton Junior-Senior High School Littleton, MA</p>
08/12/88	<p>“Osteoarthritis and Sports Injuries” <u>Brockton Hospital Grand Rounds</u> Brockton, MA</p>

- 07/27/88 “Catastrophic Sports Injuries”
Omni Specialty Sports Medicine Update American Medical Tennis Association
Waterville Valley, NH
- 07/26/88 “When To Return To Contact Sports After A Head Injury”
Omni Specialty Sports Medicine Update American Medical Tennis Association
Waterville Valley, NH
- 07/25/88 “Prevention of Athletic Spine Injuries”
Omni Specialty Sports Medicine Update American Medical Tennis Association
Waterville Valley, NH
- 06/24/88 “The Diagnosis and Treatment of Degenerative Cervical and Lumbar Spine Disease”
Binghamton General Hospital Grand Rounds
Binghamton, NY
- 06/24/88 “Low Back Pain: Etiology, Diagnosis, and Treatment”
Binghamton, NY
- 06/23/88 “Athletic Catastrophic Sports Injury Study (1931-1987):
Which Sports Are At Greatest Risk and What Is Being Done To Reduce Injury”
Binghamton, NY
- 06/17/88 “Osteoarthritis - As It Relates To Sports Injuries”
St. John’s Hospital Grand Rounds
Lowell, MA
- 06/10/88 “Catastrophic Sports Injuries: Which Sports Are At Greatest Risk
and What Is Being Done To Reduce Injury”
Sports Medicine Update ‘88
Westford, MA
- 05/31/88 “Head and Neck Injuries in Rugby”
International Conference on Rugby Injuries
Boston, MA
- 05/28/88 “Sudden Death - Ice Hockey”
American College of Sports Medicine Annual Meeting
Dallas, TX
- 05/28/88 “Catastrophic Sports Injuries: Which Sports Are At Greatest Risk
and What Is Being Done To Reduce Injury”
American College of Sports Medicine Annual Meeting
Dallas, TX
- 05/27/88 “Discogenic Low Back Pain”
American College of Sports Medicine Annual Meeting
Dallas, TX
- 05/26/88 “Cervical Spine Evaluation”
Clinical Workshop
American College of Sports Medicine Annual Meeting
Dallas, TX

05/26/88 “Headache and Convulsion - Aerobic Exercise”
Clinical Lecture
American College of Sports Medicine Annual Meeting
Dallas, TX

05/25/88 “When to Return to Contact Sports After a Cerebral Concussion”
Tutorial Lecture
American College of Sports Medicine Annual Meeting
Dallas, TX

04/28/88 “Football Catastrophic Sports Injury Experience 1987”
Sports Medicine Section
American Association of Neurological Surgeons
Toronto, Canada

04/25/88 “When to Return to Contact Sports After Head Injury”
Panel Chairman: Breakfast Seminar
American Association of Neurological Surgeons
Toronto, Canada

03/24/88 “High School and College Catastrophic Sports Injury Survey:
Which Sports Are At Greatest Risk and What is Being Done To Reduce Injury”
Drake University Sports Medicine Conference
Des Moines, IA

03/24/88 Returning to Action After a Head Injury”
Drake University Sports Medicine Conference
Des Moines, IA

03/10/88 “Catastrophic Injuries in High School and College Athletes”
Writer’s Conference American College of-Sports Medicine
New York, NY

03/05/88 “Return to Contact Sports After a Cerebral Concussion”
Fitness in Sports Fourth Annual Conference
Fort Worth, TX

02/09/88 “Feeling Fit After Forty”
Community Health-Lecture Series
Emerson Hospital
Concord, MA

01/31/88 “Update on Field Management of Head and Neck Injury”
1988 Lake Placid Sports Medicine Conference
Lake Placid, NY

01/30/88 “Concussion in Athletes”
1988 Lake Placid Sports Medicine Conference
Lake Placid, NY

11/06/87 “Head, Neck, and Back Injuries”
American College of Sports Medicine, New England Chapter
Worcester, MA

11/04/87	<p>“Low Back Pain” <u>Nashoba Community Hospital Grand Rounds</u> Ayer, MA</p>
09/20/87	<p>“When to Return to Contact Sports After a Head Injury” <u>New Hampshire Medical Society</u> Mt. Washington, NH</p>
08/07/87	<p>“When to Return to Contact Sports After a Cerebral Concussion” <u>Community Health Lecture</u> Emerson Hospital Concord, MA</p>
08/03/87	<p>“Comparison of Exercycle and Monark Bicycles: Maximal Oxygen Uptakes” Exercycle Corporation Newport, RI</p>
07/28/87	<p>“New Concepts in the Treatment of Spinal Injuries” <u>Symmes Hospital Grand Rounds</u> Arlington, MA</p>
06/05/87	<p>“When to Return to Contact Sports After a Cerebral Concussion” <u>New England Neurosurgical Society</u> Cambridge, MA</p>
05/29/87	<p>“On-Site Evaluation of Head and Spine Injuries” Clinical Workshop <u>American College of Sports Medicine Annual Meeting</u> Las Vegas, NV</p>
05/29/87	<p>“Acute and Chronic Brain Injury in Contact Sports: Historical Perspective and Overview” <u>American College of Sports Medicine Annual Meeting</u> Las Vegas, NV</p>
05/29/87	<p>“Acute and Chronic Brain Injury in Contact Sports” Symposium Chairman <u>American College of Sports Medicine Annual Meeting</u> Las Vegas, NV</p>
05/08/87	<p>“Role of the Neurosurgeon In Sports Medicine” Panel Chairman: Breakfast Seminar <u>American Association of Neurological Surgeons</u> Dallas, TX</p>
05/01/98	<p>When to Return to Contact Sports After a Cerebral Concussion <u>Sports Medicine Update '87</u> Westford, MA</p>
04/24/87	<p>“Extracranial Vascular Disease - The Carotid Endarterectomy Controversy” <u>Primary Care in Stroke: Putting the Puzzle Together</u> Westford, MA</p>

- 04/06/87 “Brain Injuries In Football and Boxing - Can They be Prevented?”
Hot Topics in Sports Medicine and Sports Science ‘87
New York, NY -
- 02/27/87 “Medical Aspects of Boxing”
American College of Sports Medicine Clinical Conference
Keystone, CO
- 02/26/87 “Discogenic Disease - Surgical and Non-Surgical Approaches”
American College of Sports Medicine Clinical Conference
Keystone, CO
- 02/24/87 “Concussion - What Is It?: Guidelines for Returning to Sports”
American College of Sports Medicine Clinical Conference
Keystone, CO
- 02/23/87 “Acute and Chronic Brain Injury and Contact Sports”
American College of Sports Medicine Clinical Conference
Keystone, CO
- 01/08/87 “Guidelines for Return to Contact Sports After a Cerebral Concussion”
International Symposium on the Prevention of Catastrophic Sport, and Recreational Injuries to the Spine and Head
Toronto, Canada
- 01/07/87 “The Activities Leading to Head Injury”
International Symposium on the Prevention of Catastrophic Sports and Recreational Injuries to the Spine and Head
Toronto, Canada

Bruce Deal, Analysis Group

BRUCE F. DEAL
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Mr. Deal is a Managing Principal of Analysis Group and leads the economic consulting practice in the Menlo Park, California office. He has over 20 years of experience in economic, litigation and management consulting. He has developed and managed many assignments requiring complex economic analysis of publicly available and internal client information.

He has served as an expert witness in many litigation and regulatory matters, and has been retained as a neutral expert in a complex mediation. His work as an expert has covered a variety of practice areas, including antitrust, finance and securities litigation, damages, and business valuation. Mr. Deal's industry experience has included insurance, technology, healthcare, telecommunications and others.

Prior to joining Analysis Group, Mr. Deal spent several years as a Senior Consultant and Manager with Arthur Andersen. In this position, he provided financial and management consulting services to hospitals, physicians, and other clients, in such areas as operational organization and efficiency, merger and consolidation strategies, current and projected financial performance, and overall strategic planning.

Mr. Deal has taught economics and analytic methods to graduate students at Harvard University and published articles on economics-related topics. He has also consulted on national economic policy issues to the government of Indonesia through the Harvard Institute for International Development.

He co-authored a major report, *The Economic Effects of Federal Participation in Terrorism Risk* with Glenn Hubbard, an Analysis Group affiliate and former chair of the President's Council of Economic Advisers. In addition, he also co-authored a study, *Economic Impact Analysis: Proposition 71 California Stem Cell Research and Cures Initiative* with Laurence Baker, an Analysis Group affiliate and Stanford University School of Medicine faculty member, with whom he published an updated interim economic report on California's Stem Cell initiative. He is also the co-author of a chapter on the use of econometrics in antitrust litigation for a recent American Bar Association publication.

Bruce Deal, Analysis Group

Summary of Projects by Topic

Insurance (Health Insurance Included in Healthcare Section)

- *Life Insurance Consulting*
Valuation and analysis of a portfolio of large life insurance policies.
- *Long Trust v. Morgan Stanley*
Analysis of financial issues and damages resulting from alternative policy restructuring options for second-to-die estate planning life insurance policies.
- *Insurance Tax Litigation*
Consulting expert in a confidential tax litigation involving the tax treatment of certain insurance premiums.
- *Confidential Auto Insurance Litigation*
Analysis of issues relative to claims handling practices of a large auto insurance company.
- *Confidential Life Insurance Litigation*
Analysis of damages resulting from alternative portfolios of investments and second-to-die life insurance policies.
- *Confidential Insurance Litigation*
Analysis of damages resulting from lost commissions in an insurance broker insurance litigation.
- *Katz. v. Mass Mutual*
Analysis of potential damages in a disability insurance litigation.
- *Confidential Insurance Litigation*
Expert on insurance valuation and general damages issues in a dispute involving non-traditional life insurance.
- *Markocki v. Olde Republic Title Insurance*
Expert on class certification issues in a class action regarding charges for title insurance.
- *Campbell v. Metropolitan Life*
Expert on damages calculation in a disability insurance dispute.
- *Cox v. Allstate*
Expert on statistical sampling in the class certification phase of a class action alleging improper homeowners' insurance claims handling by Allstate.
- *Class Action v. Wellpoint*
Expert on class certification matters in a class action alleging improper termination of a health insurance company.
- *Confidential Title Insurance Matter*
Consulting effort on class certification matters in a large multi-state class action.

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- *Estate Planning Life Insurance Matter*
Consulting expert analyzing issues associated with the economic performance of a portfolio of large estate planning life insurance policies.
- *Confidential Homeowners' Insurance Matter*
Consulting expert analyzing issues associated with the use of various data sources to obtain replacement values.
- *Confidential Indemnity Insurance Investigation*
Consulting expert analyzing issues associated with the deterioration of a set of financial products insured by an indemnity insurer.
- *Confidential Auto Insurance Investigation*
Consulting expert analyzing various aspects of auto insurance claims issues.
- *Confidential Life Insurance Litigation*
Consulting expert valuing life insurance policies and other damages issues.
- *Confidential Life Insurance Litigation*
Consulting expert valuing life insurance policies and other damages issues.
- *Hausman v. Union Bank*
Testifying damages expert valuing life insurance policies and other damages issues. Expert report provided.
- *Perez v. First American Title Insurance Company*
Testifying expert evaluating class certification issues relating the use of electronic data in identifying class members.
- *Windham v. Cook Life Insurance Litigation*
Testifying expert valuing policy performance of a variable universal life insurance contract used in a tax planning program. Expert report and trial testimony provided.
- *Confidential Class Action Litigation*
Consulting expert analyzing statistical issues associated with the use of a software package used to assist in evaluating bodily injury claims.
- *Confidential Class Action Litigation*
Consulting expert analyzing statistical issues associated with diminished value claims in auto insurance.
- *Pavlov et. al. v. CNA*
Testifying expert analyzing class certification issues associated with long term care insurance.
- *Confidential Class Action Litigation*
Consulting expert analyzing statistical issues associated with claims handling in auto insurance.
- *Class Action v. CNA*
Testifying expert in case involving long term care insurance premium rates.

Bruce Deal, Analysis Group

- *Confidential Pension Litigation, August, 2006 – ongoing*
Consulting expert in analysis of actuarial and accounting issues in a defined benefit pension plan.
- *Best Buy v DDR, October, 2006 – ongoing*
Testifying expert in analysis of insurance costs applicable to common areas of retail developments.
- *Barnes & Noble v DDR, May, 2005 – December, 2006*
Testifying expert in analysis of insurance costs applicable to common areas of retail developments.
- *Fireman's Fund v. Cunningham Lindsey, April, 2005 – February 2007*
Testifying expert in analysis of damages related to third-party administration of a commercial auto insurance program.
- *Confidential Regulatory Investigation, May, 2005 – March, 2006*
Consulting expert in analysis of policy forms used by a property casualty insurer and corresponding policy forms approved by state regulators.
- *Variable Annuity Writer, February, 2005- ongoing*
Consulting expert in analysis of remediation for deficiencies in administering variable annuities. Assisting with analyzing remediation package and negotiating with regulators and other parties.
- *CSR v. Lloyd's Underwriters, May, 2004 –December, 2004*
Testifying expert in coverage litigation involving liability insurance. Report focused on the availability and worldwide capacity for liability insurance during the relevant periods.
- *Economic Impact of Federal Participation in Terrorism Risk, May, 2004 –September, 2004*
Co-author study with Professor Glenn Hubbard, former Chair of the Council of Economic Advisers. Study focuses on the economic impact of the Federal TRIA terrorism legislation and the economic impact of failing to renew the legislation. Study commissioned by numerous insurance trade organizations.
- *Class Action v. Allstate, May, 2002 – May, 2004*
Consulting expert on damages and other issues relating to the estimation of inherent diminished value that may still be present after a vehicle has been repaired following an accident.
- *Class Action v. American Home, November, 2002 – December, 2002*
Damages expert for American Home in a litigation involving alleged mis-reporting of certain types of claims to the Workers' Compensation Insurance Rating Bureau (WCIRB) of California.
- *Class Action v. State Compensation Insurance Fund, December, 1997 – December, 2002*
Damages expert for plaintiffs in a litigation involving claims estimation and reserving practices of State Compensation Insurance Fund in California.
- *Class Action v. Knights of Columbus, 2001 – June 2004*
Economic expert for the Knights of Columbus in a major sales practices litigation involving over 500,000 policyholders. Estimated the damage to policyholders under alternative theories of liability, including development of computer-based policy performance models.

Bruce Deal, Analysis Group

- *Various Confidential Class Action Litigations v. Mutual Life Insurance Companies, 1997 - 2001*
Consulting expert in the analysis of sales practices for four major class action litigations involving between 100,000 and 3.6 million policyholders. Work included estimating the incidence of various allegations, evaluating the financial exposure and recommending alternatives to management and directors.
- *Insurance Modal Premium Litigation, June, 2001 – December, 2002*
Consulting expert on issues relating to the estimation of potential damages exposure for modal premium litigation. Prepare preliminary analyses of economic costs and benefits of modal premium payments on policyholders.
- *Confidential Liability Insurance Coverage Litigation, January, 2001 – September, 2001*
Economic expert in insurance coverage litigation. Managed the abstracting and statistical analysis of information contained in paper records useful for determining the possible insurance coverage.
- *Confidential Disability Insurance Sales Practices Litigation, July, 2000 – December, 2002*
Consulting expert for issues related to the sale and product performance of individual disability insurance policies. Designed and implemented large data abstracting effort for the insurance company defendant and assisted in the development and implementation of a settlement for tens of thousands of policyholders.
- *Confidential Mortgage Insurance Litigation, March, 2000 – June, 2002*
Consulting expert in a large litigation involving primary mortgage insurance. Analysis of issues involving the provision of various types of services and insurance products.
- *Health Insurance Redesign Litigation, November, 1998 – February, 1999*
Consulting expert in the analysis of a major health insurance benefit redesign program. Analysis of various issues associated with estimating damages and developing overall damages models.
- *Confidential Insurance Coverage Litigation Involving Toxic Waste Cleanup Costs, August, 1998 – December, 2000*
Consulting expert in the analysis of the allocation of toxic waste cleanup costs across various insurance companies. Development of a sophisticated model to predict the allocation behavior of the claimant under alternative scenarios. Assist client personnel and counsel in modeling the impact on the client insurance company under different scenarios to assist in litigation and settlement negotiations.
- *Class Action v. Ohio National, July, 1998 – July, 1999*
Economic expert for Ohio National in a major class action litigation involving over 100,000 Whole Life and Universal Life policies. Estimated the incidence of various allegations, evaluated financial exposure, presented recommendation to management and outside counsel, and developed models to project ultimate class member “take rates” for particular forms of relief.
- *Arroyo v. Alexander & Alexander, November, 1998 – February, 1999*
Damages expert in a sales practices case involving the sale and subsequent performance of a Universal Life insurance policy. Analyzed exposure and damages.

Bruce Deal, Analysis Group

- *Life Insurance/Pension Program Litigation, November, 1998 – July, 1999*
Consulting and testifying expert in a complex sales practices case involving the sale of Universal Life insurance policies used to help fund a pension program for a large trade association. Analysis assisted counsel in determining exposure and damages.
- *Morris v. Fremont Life, November, 1998*
Consulting expert to assist in evaluating sales practices of an insurance agent selling an annuity product.
- *Archuletta v. Fremont Life, October, 1997*
Consulting expert to assist in refuting damages claims put forward by Plaintiff's expert regarding the sale and performance of a Universal Life insurance policy.

Finance and Securities

- *Confidential Investment Return Litigation*
Testifying expert in a confidential arbitration involving the expected rates of investment returns on different assets classes into the future.
- *Class Action Securities Litigation (Confidential)*
Consulting expert on loss causation issues in a large bondholder securities case.
- *Class Action Securities Litigation (Confidential)*
Consulting expert on loss causation issues in a large securities case.
- *Business Interruption (Confidential)*
Consulting expert in a case involving business interruption for a finance and securities firm.
- *Mortgage Securities Litigation (Confidential)*
Consulting expert in a class action litigation alleging that the financial performance of mortgage securities were adversely affected by poor underwriting and appraisals.
- *Securities Derivative Litigation (Confidential)*
Consulting expert in a derivative litigation alleging that an acquisition failed to adhere to appropriate corporate governance policies.
- *Confidential Cash-Balance Pension Litigation, August, 2010 – present*
Consulting expert in a litigation involving the damages calculation for a class of cash balance pension participants who terminated prior to retirement.
- *Confidential CDO Litigation, March, 2010 – present*
Consulting expert in a litigation involving the valuation, financial performance, and default history of various collateralized debt obligations.
- *Confidential Securities Litigation, January 2008 – 2010*
Consulting expert in a 10b-5 securities litigation.

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- *Confidential Tax Shelter Litigation, September 2007 - 2009*
Consulting expert in a tax litigation matter for the State of California analyzing the economic basis for an identified series of transactions.
- *Confidential Securities Class Action, October 2006 - 2009*
Consulting expert in large securities class action matter involving allegations of failure to provide accurate financial guidance.
- *Stock Option Backdating Litigation, July 2007 – 2009*
Consulting expert on stock option backdating matter.
- *Portfolio Diversification, August 2006 – July 2007*
Consulting expert on issues relating to portfolio diversification in a large trust.
- *Stock Option Backdating Litigation, November 2006 – 2008*
Consulting expert on stock option backdating matter in private securities litigation.
- *Confidential SEC Investigation, December 2006 – June 2007*
Consulting expert on SEC investigation relating to reinsurance disclosures.
- *Confidential Mutual Fund Litigation, May, 2006 – November, 2006*
Consulting expert on litigation related to late trading of international mutual funds.
- *Williams Communication Securities Litigation, October, 2004 – 2007*
Consulting expert on 10b5 litigation alleging audit failures led to stock decline. Case dismissed.
- *Class Action v. Ernst & Young, October, 2004 – 2005*
Consulting expert on 10b5 litigation alleging audit failures led to stock decline. Case went to verdict with a no liability verdict for client, Ernst & Young.
- *Confidential Securities Litigation, December, 2003 – 2004*
Consulting expert assisting academic affiliate in analysis focused on reasonableness of company disclosures based on internal company budgets and forecasts.
- *Confidential Securities Litigation, March, 2002 - 2003*
Consulting expert for counsel in securities litigation focused on company disclosures.
- *IRS v. Center Apartments, January, 2003 – 2003*
Consulting expert assisting Professor Steve Grenadier in the analysis of proper commercial apartment mortgage interest rates.
- *Class Action v. Major Investment Bank, October, 1997 – 1999*
Consulting expert analyzing the impact of releasing allegedly fraudulent investment information on the stock price of two small software companies for a 10b-5 securities litigation.
- *Class Action v. Conseco, January, 1999 - 1999*
Consulting expert analyzing the value of a proposed settlement involving Universal Life crediting rates. Assisted expert in the financial evaluation of the value of the proposed settlement using interest rate simulation models.

Bruce Deal, Analysis Group

- *IRS v. Major Retail Chain, 1998*
Consulting expert in defense of a major retail chain. Provided assistance in evaluating various expert reports involving the economic consequences of the purchase of a particular investment.
- *In re: NASDAQ Market Maker Antitrust Litigation, April, 1997 –1998*
Consulting expert analysis of millions of stock transactions for seven different NASDAQ market makers facing allegations of conspiracy and price-fixing.

Commercial Damages

- *2880 Stevens Creek v. Blach Construction, 2011-12*
Testifying expert on loss-of-use damages in litigation involving construction defects.
- *Polteco v. Tecsalt, 2006 – 2010*
Testifying expert on damages in litigation involving the failure of specialized machinery in a manufacturing operation.
- *Confidential Auto Dealership Litigation, 2008 -2009*
Analysis of liability and damages issues in litigation involving auto dealership sales practices.
- *F&A Restaurant Group v. Shepard and Reyes, 2006*
Analysis of damages relating to the sale of a restaurant. Provided arbitration testimony.
- *US Unwired v. Sprint, 2004 - 2005*
Assist Analysis Group affiliate Robert Hall in the damages analysis associated with the change in status of Sprint's affiliate, US Unwired. Case settled after trial testimony had been presented.
- *Confidential Enterprise Software Litigation, June, 2004 –2005*
Assist Analysis Group affiliate in the damages analysis associated with loss of business in the enterprise software market.
- *Her Associates v. Kaiser, October, 2003 –2004*
Damages expert for defense in litigation related to consulting firm's damages claim.
- *General American v. KPMG, January, 2003 –2004*
Damages expert for plaintiffs in litigation related to auditor's alleged obligation to disclose certain financial instruments.
- *Creative Artists v. County of Santa Clara, September, 2001 –2003*
Damages expert for defense in litigation related to the cancellation of musical events at facilities owned by the County of Santa Clara.
- *Class Action v. Ford Credit, Fall 2000 –2002*
Damages expert for plaintiffs analyzing the costs and charges associated with late fees on consumer auto leases.

Bruce Deal, Analysis Group

- *Bar None v. The Duncan Group, January, 2001 –2001*
Damages expert for defense analyzing damages associated with the failed efforts to develop a software program to be used in automating the sub-prime auto lending business.
- *Coram v. Aetna, January, 2000 –2000*
Consulting expert for defense analyzing the damages associated with a home healthcare contract that experienced higher costs than anticipated. Supported industry expert in the cost analysis.
- *Confidential Breach of Contract Litigation, September, 1999 –2000*
Consulting expert for defense analyzing the damages associated with the failed joint venture development of a removable storage device for personal computers. Supported academic expert in the analysis of damages.
- *Bourns v. Raychem, September, 1999 –2000*
Consulting expert for defense analyzing damages associated with the monopolization of the market for primary lithium battery safety devices. Supported academic experts in the analysis of damages.
- *Procter & Gamble v. Amway, April, 1997 –1999*
Consulting expert for plaintiff analyzing the impact of disparaging comments and rumors on the sales of Procter & Gamble products. Supported academic experts in the analysis of primary and secondary data sources and the development of surveys and laboratory experiments to test the impact of rumors on consumer behavior.

Valuation / Intellectual Property

- *Confidential Business Valuation*
Designated expert in a business valuation for a medical practice.
- *Confidential Patent Litigation*
Consulting expert in litigation involving PC networking technology.
- *Confidential Patent Litigation*
Consulting expert on determination of royalty amounts in a confidential semiconductor patent litigation.
- *Confidential High-Technology Manufacturing Company Valuation*
Valuation expert analyzing economic factors associated with the value of a closely held manufacturer of specialized high-technology components for defense applications.
- *Confidential Beverage Distributor Valuation*
Valuation expert analyzing the value of the large beverage distributor.
- *Confidential Patent Infringement Litigation*
Consulting expert on reasonable royalties and damages in the semiconductor industry.
- *Appaloosa Interactive Corporation v. Stephen Friedman and Related Cross-Actions, 2007*
Valuation and damages expert in the video game development industry.
- *Confidential Insurance Company Valuation, 2006 – 2008*

Bruce Deal, Analysis Group

Valuation expert analyzing the value of a private auto insurer.

- *Carrino v. Carrino, April, 2006 –2006*
Valuation expert analyzing the value of an investment management firm. Provided testimony in court.
- *Confidential Valuation, March 2006 –2006*
Valuation expert analyzing the value of capital contributions to a series of jointly invested real estate transactions.
- *Confidential Company Valuation, November 2005 –2006*
Valuation expert analyzing a privately held healthcare provider.
- *Confidential Company Valuation, October 2005 –2006*
Valuation expert analyzing a privately held consulting firm.
- *Confidential Software Distribution Dispute, November 2005 - 2006*
Damages expert in an arbitration involving software distribution.
- *Capo v. Diopics, January – February 2005- 2006*
Intellectual property damages expert in a trade dress case involving protective sunglasses.
- *Arthur Stockton v. Fidelity & Deposit, September, 2004 –2005*
Analysis of the value of an investment management firm and any damages related to the payment of claims by the insurer.
- *Confidential Company Valuation, July, 2003 –2004*
Valuation expert analyzing a privately held construction firm.
- *Redlands Insurance Company v. Edward Wolkowitz, May, 2002 - 2002*
Valuation expert for plaintiff analyzing the valuation and rating analysis of Redlands Insurance Company, a property and casualty insurer.
- *Confidential Catastrophic Insurance Company Valuation, March, 2000*
Consulting expert for defense analyzing the valuation methodology used by the plaintiffs in the valuation of a catastrophic risk insurance modeling company.
- *Trigon v. United States of America, December, 2000 –2001*
Valuation expert for defense analyzing the valuation methodology used by plaintiffs' expert for intangible assets.
- *Synbiotics v. Heska, November, 1999 –2002*
Damages expert for defense in a patent infringement case involving antibody tests for animal diseases.
- *Air Products v. ATMI, November, 2000*
Damages expert in a patent infringement case involving gases used for semiconductor manufacturing.

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- *Confidential Telecommunications Equipment Trade Secret Litigation, March, 1999 –2000*
Consulting expert analyzing the potential damages from the sale of telecommunications equipment allegedly containing trade secrets. Support Analysis Group expert in the analysis of relevant data and development of reasonable royalty damages estimates and potential lost profits.
- *Bingo Card Minder v. Gametek, March, 1998 –1999*
Consulting expert analyzing reasonable royalties for a hand-held computer-based consumer product. Supported Analysis Group expert in the analysis of relevant data and development of reasonable royalty percentages.

Healthcare

- *Confidential Class Action Litigation*
Consulting expert on damages issues in a dispute over coverage issues for certain types of individual life insurance policies.
- *Confidential Payor/Provider Dispute*
Consulting expert on damages issues in a dispute between a payor and provider involving the payment terms and allowed services.
- *Confidential Payor/Provider Dispute*
Consulting expert on damages issues in a dispute between a payor and provider involving the payment terms and allowed services.
- *Confidential Arbitration*
Expert on damages issues in a dispute between a payor and provider affecting enrollment and profitability for a large Medicare managed care program and other patient programs.
- *Confidential Arbitration*
Expert on damages issues in a dispute between a payor and provider regarding a change in payment methodology.
- *Clark v Blue Shield*
Expert for defense assisting in the economic analysis of policy rescission.
- *Confidential Arbitration*
Expert on damages calculation in a dispute between a health insurer and a provider of supplemental insurance benefits.
- *Confidential Hospital Association*
Consultant assisting with evaluating Medicaid financing arrangements among hospitals.
- *Paul v Blue Shield*
Expert for defense assisting in the economic analysis of policy rescission.
- *Simoes v Blue Shield*
Expert for defense assisting in the economic analysis of policy rescission.

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- *Hailey v Blue Shield*
Expert for defense assisting in the economic analysis of policy rescission.
- *Leyra v. Blue Shield, June 2006 – January 2007*
Expert for defense assisting in the economic analysis of liability for policy rescission.
- *Sutter v. Blue Shield, June 2006 – November 2006*
Consulting expert for defense assisting in the economic analysis of hospital charges.
- *Various Health Insurance Matters, 2005 - 2009*
Consulting expert for defense assisting in the economic analysis of policy rescissions.
- *Class Action v. Health Insurer, June 2005 –2006*
Consulting expert for defense assisting in the economic analysis of liability for alleged misclassification of patient populations.
- *Missouri Stem Cell Economic Valuation, November, 2004 –2005*
Authored a study examining the likely economic impact of possible health research breakthroughs for healthcare costs in Missouri.
- *California Stem Cell Economic Impact Valuation, September, 2003 –2004*
Co-authored a study with Professor Laurence Baker of Stanford examining the likely economic impact of a proposed major health research initiative in California.
- *Health Guideline Analysis, June, 2000 –2003*
Consulting expert leading a team of health economists and statisticians in the evaluation of clinical and payment guidelines developed for heart valve replacement surgery.
- *California Attorney General v. Alta Bates/Summit Medical, September, 1999 –1999*
Consulting expert analyzing the ability of managed care plans to move patients in response to quality or price incentives. Supported industry expert in developing report and preparing for deposition.
- *Various Hospital Mergers, November, 1991 –1997*
Financial expert for various clients analyzing proposed mergers between not-for-profit community hospitals. Estimated the potential efficiencies resulting from the mergers, conducted market research on community needs, and presented findings to management, directors and outside counsel.
- *Class Action Health Insurance Litigation, June, 2000 –2001*
Hired by the nation's largest mediation service to serve as a neutral expert in a litigation involving the calculation of health insurance payments. Worked with experts from both sides and assisted the mediator in bringing the parties to a settlement.

Antitrust and Other Cases

- *Confidential Antitrust Investigation*
Consulting expert on antitrust issues in the automobile industry.

Bruce Deal, Analysis Group

- *U.S. Department of Justice v. Richard Bai*
Testifying expert on antitrust issues in a price-fixing case in the LCD industry.
- *Confidential Antitrust Investigation*
Consulting expert on antitrust issues in a high-technology industry.
- *Indirect Purchaser Class Action v. AUO, et al*
Designated testifying expert on antitrust issues in an alleged price-fixing case in the LCD industry.
- *Korean Fair Trade Commission v. AUO, et al*
Designated testifying expert on antitrust issues in an alleged price-fixing case in the LCD industry.
- *U.S. Department of Justice v. AUO*
Designated testifying expert on antitrust issues in an alleged price-fixing case in the LCD industry.
- *Confidential Antitrust Investigation, 2007 - ongoing*
Consulting expert on antitrust issues in a high technology industry.
- *Confidential Predatory Pricing Litigation, 2008 - ongoing*
Consulting expert on litigation related to antitrust claims in the replacement auto parts industry.
- *Confidential Private Antitrust Litigation, May 2006 - 2010*
Consulting expert on litigation related to antitrust claims in the building construction industry.
- *Regulatory Investigation, March 2006 –2007*
Consulting expert for government regulatory body investigating allegations of consumer overcharges.
- *Class Action v. Noranda and DuPont, May 2005 –2006*
Consulting expert for defense assisting in the economic analysis of liability for alleged antitrust violations affecting sulfuric acid in the United States.
- *Class Action v. Microsoft, November 2001 –2007*
Consulting expert for defense assisting in the economic analysis of antitrust liability and damages issues in a series of price overcharge litigations. Assist various academic affiliates, including Professor Robert Hall.
- *Neon v. BMC Antitrust Litigation, March, 1999 –1999*
Consulting expert for plaintiffs analyzing antitrust violations in the sale of computer software for large computer databases. Support academic affiliate expert in the analysis of relevant data and development of damages estimates.
- *CFM. v. Dainippon Screen Mfg. Co., August, 2000 –2001*
Consulting expert for defense analyzing the potential monopolization by CFM of the semiconductor cleaning market. Support academic affiliate, Professor Robert Hall.
- *Proposed merger of WorldCom and Sprint, February, 2000 –2000*
Consulting expert assisting in the economic evaluation of the proposed merger between WorldCom and Sprint. Evaluate issues relating to market share and pricing of residential long distance services.

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EDUCATION

- 1994-97 Ph.D. coursework completed, Public Policy, Graduate School of Arts and Sciences, Harvard University, Cambridge, MA
- 1990 M.P.P., Public Policy, Kennedy School of Government, Harvard University, Cambridge, MA
- 1987 BA, *Summa cum Laude*, Economics and Global Studies, Pacific Lutheran University, Tacoma, WA

TEACHING

- 1994-96 Teaching Fellow, *Analytic Methods*, Kennedy School of Government, Harvard University.
- 1994-96 Instructor, *Economics Summer Program for Mid-Career Graduate Students*, Kennedy School of Government, Harvard University.
- 1989-90 Teaching Assistant, *Statistics*, Kennedy School of Government, Harvard University

PUBLICATIONS AND REPORTS

“*Presentation of the Results*”, chapter co-authored with Samuel Waglein, *Econometrics: Legal, Practical, and Technical Issues*, Published by the American Bar Association, 2014.

Deal, Bruce and Baker, Laurence, CIRM (California Stem Cell Agency) - *Interim Economic Impact Review*, October 10, 2008

“Risk Management and the Economic Impact of Terrorism,” with Peter Hess, Chapter in *Business Continuity and Homeland Security, Volume 1*, edited by David H. McIntyre and William I. Hancock, Edward Elgar Publishing, London, UK, forthcoming (April 2008).

Deal, Bruce, *Winning Initiative Campaigns with Economic Analysis*, Campaigns & Elections, February 2006: 39.

Hubbard, R. Glenn, Bruce Deal, and Peter Hess, *The Economic Effects of Federal Participation in Terrorism Risk*, Risk Management and Insurance Review, 2005, Vol. 8, No. 2, 177-209.

Bruce Deal, Analysis Group

Baker, Lawrence and Bruce Deal, *Some Economic Implications of State Stem Cell Funding Programs*, Prepared for “States and Stem Cells: A Symposium on the Policy and Implications of State-Funded Stem Cell Research, Woodrow Wilson School, Princeton University, April 15, 2005

Deal, Bruce, *Health Analysis of the Potential Benefits of SCNT Stem Cell Research and Therapies in Missouri: Patient Population and Health Care Costs*, February 8, 2005

Deal, Bruce and Hubbard, Glenn, *The Economic Effect of Federal Participation in Terrorism Risk*, September 14, 2004

Deal, Bruce and Baker, Laurence, *Economic Impact Analysis Proposition 71: California Stem Cell Research and Cures Initiative*, September 14, 2004

Deal, Bruce and Tiscornia, John F., “Hospital Consolidation: Optimal Strategy for a Two-Hospital Town”, in Austin Ross and Mary Richardson, eds., *Ambulatory Health Care: Case Studies for the Health Services Executive*, Health Administration Press, 1996.

PRESENTATIONS

“Modern Strategies & Approaches in Consumer Class Action Suits”, presented on expert witness issues at a continuing education forum for attorneys sponsored by the National Law Journal, November, 2012

“The Subprime Mortgage Crisis and Disclosures: What Went Wrong?”, presented at a Webinar continuing education forum for attorneys sponsored by Analysis Group/Economics, July 29, 2008

“The Subprime Mortgage Crisis and Disclosures: What Went Wrong?”, presented at a continuing education forum for attorneys sponsored by Analysis Group/Economics, June 24, 2008, San Francisco, CA.

“Stock Option Backdating”, presented at a continuing education forum for attorneys sponsored by Analysis Group/Economics, March 21, 2007, New York, NY.

“Stock Option Backdating”, presented at a continuing education forum for attorneys sponsored by Analysis Group/Economics, November 7, 2006, Menlo Park, California and San Francisco, California.

“Overview of Stem Cell Legislation”, Moderator and Presenter at Presentation on Implementing California’s Stem Cell Initiative, March 9, 2004, Sponsored by the Food and Drug Law Institute (FDLI) San Mateo, CA

Bruce Deal, Analysis Group

“Challenges to Expert Testimony”, Presentation at Law Seminar International Conference, November 5, 2004, San Francisco

“Federal Terrorism Insurance Panel Discussion”, Presentation and Panel Participant, National Press Club, Washington D.C., October 24, 2004

“Insurance 101”, presentation on the design and performance of Whole Life and Universal Life policies, presented to Customer Services Representatives administering a life insurance sales practices settlement, April 27, 1999, Ogden, Utah.

“Antitrust Case Study: NASDAQ Market Maker Litigation”, presented at a continuing education forum for attorneys sponsored by Analysis Group/Economics, September 15, 1998, Menlo Park, California and San Francisco, California.

“An Economist’s Perspective on Life Insurance Sales Practices Problems”, presented at the Spring Meeting of the Society of Actuaries, June 15, 1998, Maui, Hawaii.

“Valuing Intellectual Property in an Age of Employee Mobility”, presented at a continuing education forum for attorneys sponsored by Analysis Group/Economics, June 9, 1998, Menlo Park, California and San Francisco, California.

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EXPERT DESIGNATION, TESTIMONY AND REPORTS

May, 2013	Expert report in <i>Martin v. Blue Shield of California</i>
May, 2013	Expert declaration in <i>Martin v. Blue Shield of California</i>
December, 2013	Expert testimony in <i>Confidential Investment Return Litigation</i> .
December, 2013	Expert deposition in <i>Confidential Investment Return Litigation</i> .
November, 2013	Expert declaration in <i>Long Trust v. Morgan Stanley</i> .
November, 2013	Expert report in <i>Long Trust v. Morgan Stanley</i> .
November, 2013	Expert testimony in <i>Confidential Employment Litigation</i>
November, 2013	Expert deposition in <i>Confidential Employment Litigation</i>
November, 2013	Expert deposition in <i>Katz. v. Mass Mutual</i>
October, 2013	Expert report in <i>Katz. v. Mass Mutual</i>
October, 2013	Expert report in <i>Circuit City et.al. v. AUO</i>
October, 2013	Summary witness expert testimony in <i>U.S. Department of Justice v. Richard Bai</i>
January, 2013	Expert testimony in <i>Confidential Arbitration</i>
January, 2013	Expert deposition in <i>Confidential Arbitration</i>
December, 2012	Expert declaration in <i>Markocki v. Olde Republic Title</i>
December, 2012	Expert deposition in <i>Paul v. Blue Shield of California</i>
June, 2012	Expert deposition in <i>Indirect Purchaser Class Action v. AUO</i>
June, 2012	Expert deposition in <i>Asbestos Litigation v. Borg Warner</i>
May, 2012	Expert report in <i>Indirect Purchaser Class Action v. AUO</i>
April, 2012	Expert deposition in <i>2880 Stevens Creek vs. Blach Construction Co.</i>
April, 2012	Expert deposition in <i>Indirect Purchaser Class Action v. AUO</i>
March, 2012	Expert report in <i>Indirect Purchaser Class Action v. AUO</i>
February, 2012	Expert testimony in <i>United States Department of Justice v. AUO</i>
February, 2012	Expert deposition in <i>Campbell v. MetLife</i>

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November, 2011	Expert deposition in <i>Cox v. Allstate</i>
October, 2011	Expert report in <i>Cox v. Allstate</i>
October, 2011	Expert deposition in <i>Class Action v. Wellpoint</i>
October, 2011	Expert designation in <i>DOJ v. AUO</i>
October, 2011	Expert report in <i>KFTC v. AUO</i>
July, 2011	Expert report in <i>Class Action v. Wellpoint</i>
June, 2011	Expert report in confidential damages arbitration
November, 2010	Expert testimony in <i>Jasmine v. Marvell</i>
October, 2010	Expert testimony in <i>U.S. Government v. Jerry Cash</i>
July, 2010	Expert deposition in <i>M.E. Fox & Co. Valuation matter</i>
June, 2010	Expert designation in <i>M.E. Fox & Co. Valuation matter</i>
May-June, 2010	Expert testimony in <i>Polteco v. Tecsub</i>
March, 2010	Expert deposition in <i>Simoos v. Blue Shield</i>
December, 2009	Expert designation in <i>Simoos v. Blue Shield</i>
October, 2009	Affidavit in <i>Best Buy v. DDR</i>
March, 2009	Expert deposition in <i>Hailey v. Blue Shield</i>
March, 2009	Expert report in <i>Hausman v. Union Bank</i>
March, 2009	Expert report in <i>Perez v. First American Title Insurance Company</i>
March, 2009	Trial testimony in <i>Windham v. Cook</i>
February, 2009	Expert report in <i>Windham v. Cook</i>
January, 2009	Expert designation in <i>Hailey v. Blue Shield</i>
October, 2008	Deposition testimony in <i>Pavlov et. al. v. CNA</i>
September, 2008	Expert declaration in <i>Pavlov et. al. v. CNA</i>
September, 2008	Trial testimony in <i>Freidman v. Sega et. al.</i>
September, 2008	Expert report in <i>Freidman v. Sega et. al.</i>
July, 2008	Deposition testimony in <i>Freidman v. Sega et. al.</i>

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July, 2008	Deposition testimony in <i>Best Buy v. DDR</i>
June, 2008	Expert report in <i>Best Buy v. DDR</i>
October, 2007	Expert designation in <i>Rowlands v. Blue Shield</i>
September, 2007	Deposition testimony in <i>Class Action v. CNA</i>
September, 2007	Expert report in <i>Class Action v. CNA</i>
May, 2007	Deposition testimony in <i>Tronox v. Rio Algom</i>
April, 2007	Expert designation in <i>Callil v. Blue Shield</i>
April, 2007	Expert designation in <i>Abbott v. Blue Shield</i>
March, 2007	Deposition testimony in <i>Leyra v. Blue Shield Life and Health</i>
December, 2006	Expert designation in <i>Leyra v. Blue Shield Life and Health</i>
August, 2006	Arbitration testimony in <i>F&A Restaurant Group v. Shepard and Reyes</i>
July, 2006	Trial testimony in <i>Carrino v. Carrino</i>
July, 2006	Deposition testimony in <i>Carrino v. Carrino</i>
February, 2006	Arbitration testimony in <i>ART v. Riverdeep</i>
January, 2006	Deposition testimony in <i>ART v. Riverdeep</i>
December, 2005	Deposition testimony in <i>FFIC v. Cunningham Lindsey</i>
September, 2005	Deposition testimony in <i>Barnes & Noble v. DDR (Texas and Kansas)</i>
September, 2005	Expert report in <i>Fireman's Fund v. Cunningham Lindsey</i>
September, 2005	Expert report in <i>Barnes & Noble v. DDR (Kansas)</i>
August, 2005	Expert report in <i>Barnes & Noble v. DDR (Texas)</i>
March, 2005	Expert report in <i>Bioport Corporation v. Elan Pharmaceuticals</i>
February, 2005	Expert report in <i>Capo v. Dioptics</i>
February, 2005	Expert report in <i>Arthur Stockton v. Fidelity & Deposit</i>
September, 2004	Deposition testimony in <i>Her Associates v. Kaiser</i>
August, 2004	Deposition testimony in <i>CSR v. Lloyds et al.</i>

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June, 2004	Expert report in <i>CSR v. Lloyds et al.</i>
April, 2004	Deposition testimony in <i>General American v. KPMG</i>
March, 2004	Expert report in <i>General American v. KPMG</i>
March, 2004	Deposition testimony in confidential company valuation for marital dissolution.
February, 2004	Expert report in confidential company valuation for marital dissolution.
January, 2004	Deposition testimony in <i>Her Associates v. Kaiser.</i>
January, 2004	Expert report in <i>Her Associates v. Kaiser.</i>
March, 2003	Expert designation in <i>Creative Artist Network v. Santa Clara County</i>
December, 2002	Deposition testimony in <i>Redland Insurance Company v. Anthony Choy and Edward Wolkowitz</i>
November, 2002	Expert designation in <i>Academy Tent et al. Class Action v. American Home Assurance.</i>
Sept. – Dec., 2002	Trial testimony in <i>A&J Liquor, et al. Class Action v. State Compensation Insurance Fund</i>
September, 2002	Deposition testimony in <i>A&J Liquor, et al. Class Action v. State Compensation Insurance Fund</i>
July, 2002	Expert witness report in <i>Creative Artist Network v. Santa Clara County</i>
July, 2002	Deposition testimony in <i>Redland Insurance Company v. Anthony Choy and Edward Wolkowitz</i>
June, 2002	Expert declaration on insurance company valuation in <i>Redland Insurance Company v. Anthony Choy and Edward Wolkowitz</i>
May, 2002	Expert declaration on settlement valuation in <i>Class Action v. Knights of Columbus</i>
Jan - Feb, 2002	Deposition testimony in <i>A&J Liquor, et al. Class Action v. State Compensation Insurance Fund</i>
December, 2001	Deposition testimony in <i>Class Action v. Ford Credit</i>
May, 2001	Deposition testimony in <i>A&J Liquor, et al. Class Action v. State Compensation Insurance Fund</i>
April, 2001	Deposition testimony in <i>Bar None v. The Duncan Group</i>
April, 2001	Deposition testimony in <i>Trigon v. United States</i>

Bruce Deal, Analysis Group

January, 2001	Deposition testimony in <i>Heska v. Synbiotics</i>
December, 2000	Expert declaration in <i>Trigon v. United States</i>
June, 2000	Deposition testimony in <i>A&J Liquor, et al. Class Action v. State Compensation Insurance Fund</i>
May, 2000	Deposition testimony in <i>Heska v. Synbiotics</i>
July, 1999	Appeared in Federal Court on behalf of Ohio National in <i>James A. Wemer, et al. Class Action v. Ohio National</i> (did not provide testimony)
June, 1999	Submitted a report on the valuation and fairness of the proposed settlement in <i>James A. Wemer, et al. Class Action v. Ohio National</i>
January, 1999	Identified as an insurance liability and damages expert in <i>Arroyo v. Alexander & Alexander</i>
December, 1998	Expert declaration in <i>A&J Liquor, et al. Class Action v. State Compensation Insurance Fund</i>
November, 1998	Identified as an economic expert in <i>Class Action v. Ohio National</i> litigation
October, 1998	Identified as an insurance expert in <i>Morris v. Fremont Life Insurance Company</i>
September, 1998	Expert declaration in <i>Class Action v. State Compensation Insurance Fund</i>
April, 1998	Deposition testimony in <i>Handicomp, Inc. v. United States Golf Association</i>
February, 1998	Rebuttal expert report in <i>Handicomp, Inc. v. United States Golf Association</i> , co-authored with Ronald C. Curhan
February, 1998	Expert declaration in <i>Class Action v. State Compensation Insurance Fund</i>
January, 1993	Expert testimony on the likely economic impact of the merger on the hospital's operating expenses and capital expenditures in FTC administrative hearings, <i>Proposed Merger of Parkview Hospital and St. Mary Corwin Hospital</i> , Pueblo, Colorado.

Bruce Deal, Analysis Group

PROFESSIONAL MEMBERSHIPS

American Economics Association

American Bar Association (non-lawyer member)

Association for Health Services Research

COMMUNITY AND CORPORATE BOARD INVOLVEMENT

Member and Board Chair, Trinity Episcopal Church, Menlo Park, California

Member, Menlo-Atherton High School Foundation for the Future

WORK EXPERIENCE

CURRENT **Vice President**, Analysis Group, Inc.

PREVIOUS

Engagment Manager, McKinsey and Company

Diplomat, Ministry of Foreign Affairs and Trade, Wellington, New Zealand

EDUCATION

Stanford University, Stanford, California

Ph.D., Philosophy; M.A., Philosophy

Honors: Asia-Pacific Scholar

Victoria University of Wellington, Wellington, New Zealand

M.A., Philosophy (by research, with Distinction); B.Sc. (Hons), Mathematics (First-Class Honors);

B.A., Philosophy

Honors: Fulbright Scholarship; Alexander Crawford Scholarship; John P Good Math Prize; Sir Robert Stout Scholarship; French Government Prize; Postgraduate Scholarship; Junior & Senior Scholarships

PUBLICATIONS

"Group Selection, Pluralism, and the Evolution of Altruism"; *Philosophy and Phenomenological Research*, **65**(3), pp. 685-691
(with Peter Godfrey-Smith)

CURRICULUM VITAE

Lynn Huynh, MPH, MBA, DrPH

PART I

PERSONAL DATA

Work address:

Analysis Group, Inc.
111 Huntington Ave. Tenth Floor
Boston, MA 02199
Email: lhuynh@analysisgroup.com
Contact number: (617) 425-8189

EDUCATION

2012	DrPH	Epidemiology Certificate in Vaccine, Science, and Policy Johns Hopkins Bloomberg School of Public Health Department of Epidemiology Baltimore, MD, USA 01/2008 to Present Advisors: Milo Puhan, MD, PhD & Kevin Frick, PhD Thesis: EpiSol Study Simulator 1.0: A Tool to Design Cost-Efficient Epidemiological Studies
2008	MBA	Health economics Johns Hopkins Carey Business School Baltimore, MD, USA 06/2006 to 12/2007 Capstone Coach: Brian Carr Capstone Client: Johns Hopkins Bayview Medical Center Capstone Project: Business Proposal for the Johns Hopkins Cartilage Restoration Center
2008	MPH	Epidemiology & Biostatistics Certificate in Health Finance and Management Johns Hopkins Bloomberg School of Public Health Baltimore, MD, USA 06/2006 to 05/2007 Advisors: Michel Ibrahim, MD, PhD & Eric Seaberg, PhD Capstone Project: Assessment of serological fibrosis biomarkers in participants from the Multi-Center AIDS Cohort Study (MACS)

2003 BA Chemistry
Harvard University
Department of Chemistry and Chemical Biology
Cambridge, MA, USA
09/1999 to 06/2003
Advisor: Charles Lieber, PhD
Graduate mentor: Yi Cui, PhD
Thesis: Approaching the Limit: Miniaturization of Silicon
Nanowires to 2 nm for Nanotechnology

PROFESSIONAL EXPERIENCE

2012-
Present **Associate**, Analysis Group, Inc.
Address: 111 Huntington Ave. Tenth Floor, Baltimore, MA 02199
Contact #: (617) 425-8189

2009 –
2012 **Methodologist**, Cochrane Eyes and Vision Group US Project
Investigator: Roberta Scherer, PhD
Address: 615 N. Wolfe Street, Baltimore, MD 21205
Contact #: (410) 502-4636

- Review and extract study design information from abstracts of randomized controlled trials presented at the Association for Research in Vision and Ophthalmology from 2007 to 2009.
- Compare abstract data with registration report from ClinicalTrials.gov.
- Provide methodological support for analysis.
- Prepare oral presentation for the Cochrane Colloquium Annual Meeting in Madrid, Spain in 2011.

2011 – 2012 **Methodologist**, Comparative Effectiveness and Medical Interventions for Primary Open Angle Glaucoma
Project Director: Tianjing Li, MD, PhD, MHS
Address: 615 N. Wolfe Street, Baltimore, MD 21205
Contact #: 410-502-4630

- Screen, review, and extract study information on patient characteristics, and strength of association estimates for primary open angle glaucoma.
- Assess eligibility of articles and risk of bias for a systematic review.

2009 –
2012 **Consultant**, Business and Cost Assessment of the ZuziMpilo Project
Investigator: Neil Martinson, MD
Address: 59 Joubert St. 2nd Floor, Johannesburg, South Africa

- Examine and review patient medical records and clinic's financial records to answer the question is a fee-for-service HIV clinic a sustainable approach for individuals with HIV living in South Africa.

- Prepare oral presentation to be presented at the American Public Health Association meeting in Washington, DC in 2011.
- 2010 – **Methodologist**, Discrete event simulation (DES) in urgent care setting
2012 Investigator: James Stahl, MD, CM, MPH
Address: 101 Merrimac St. Boston, MA 02114
Contact #: (617) 724 4447
- Develop a simulation model that recreates the system dynamic of a primary care clinic and outpatient clinic using RFID data for the distributions for patient flow, wait time, and resource utilization.
 - Introduce interventions (translators, video conferencing, queue behavior, nurse time, scheduled visits, queuing assets, etc) into the DES model and examine outputs (patient wait time, face time with physicians, etc.).
- 2010 – **Reviewer**, Cost-effectiveness Analysis Registry
2012 Investigator: Paul Neumann, ScD
Address: Tufts Medical Center, 800 Washington Street #063, Boston, MA 02111
Contact #: (617) 636-2526
- Review and extract relevant information from journal articles that provide original cost-utility estimates on methodology, cost-effectiveness ratios, and utility weights.
- 2009 – 2010 **Consultant**, Cost effectiveness of rehabilitation program for patients with chronic obstructive pulmonary disorder (COPD)
Investigator: Milo Puhan, MD, PhD
Address: 615 N. Wolfe Street, Baltimore, MD 21205
Contact #: (443) 287-8777
- Compared the cost of three different treatment options for COPD in the United States, United Kingdom, Canada, Switzerland, Italy, and the Netherlands.
- 2008 **Fellow**, Global Framework Fellowship
Investigator: Vivian Go, PhD
Address: 615 N. Wolfe Street, Baltimore, MD 21205
Contact #: (410) 614-4755
- Identified Dr. Go's research organization mission and goals.
 - Examined individual and group goal clarity.
 - Assessed organization culture.
 - Designed research organization chart and performance management toolkit.
 - Prepared poster presentation at the American Public Health Association meeting.

- 2006 – 2012 **Methodologist**, Multi-Center AIDS Cohort Study (MACS)
Mentor: Eric Seaberg, PhD
Address: 615 N. Wolfe Street, Baltimore, MD 21205
Contact #: (410) 955-4320
- Determine whether the liver-related mortality rate has changed in the Multi-Center AIDS Cohort Study (MACS) since the advent of HAART.
 - Assessed serological fibrosis biomarkers in subjects from the MACS.
 - Evaluated the utility of the biomarkers and their correlation with viral hepatitis infection and the progression of liver disease.
- 2007 **Service Excellence Intern**, Hopkins Bayview Medical Center
Mentor: Gregory Schaffer
- Reviewed Bayview's Visitation Policy.
 - Prepared decision memo and presentation to introduce new Visitation Policy for Bayview.
 - Analyzed Press, Ganey patient satisfaction scores and respondents' demographic information.
 - Provided assistance and support to Service Excellence Specialists.
- 2005 – 2006 **Research Assistant**, Harvard Medical School, Department of Health Care Policy
Investigators: Bruce Landon, MD, MBA and Tom Keegan
Address: 180 Longwood Avenue, Boston, MA 02115-5899
Contact #: (617) 432-4335
- Collected data from community health centers nation-wide for the Health Disparities Collaboratives Project and Cancer Collaboratives Project.
 - Conducted literature review on Incentive Formularies, Costs and Quality of Care, Radiology Utilization Management/Self-Referrals, and Episode Treatment Groups.
 - Interviewed CEOs and Presidents of National Business Coalitions for Value-Based Purchasing project.
 - Designed Indicator Lists for the Cancer Collaborative project.
- 2004 – 2006 **Research Assistant**, Dana-Farber Cancer Institute, Department of Community-Based Research
Investigator: Andrea Gurmankin, PhD
Address: 450 Brookline Avenue Smith SM253, Boston, MA 02215
Contact #: (617) 582-7942
- Designed recruitment efforts for the targeted population (men at risk for prostate cancer).
 - Trained men how to use palm pilot for the study on men's thought about screening for prostate cancer.
 - Provided administrative support to project coordinator.

- 2003 – 2004 **Scholar**, Fulbright Fellowship
Mentors: Hitoshi Murakami, MD, PhD & David Hipgrave, MD, PhD
- Worked with the World Health Organization (WHO) and Program for Advanced Technology in Health (PATH) to assess the Hepatitis B birth dose rate among newborns in both rural and urban districts in Viet Nam.
 - Assisted in the facilitation of focus group discussion to qualitatively evaluate mothers' attitude and opinions toward the implementation of Hepatitis B vaccine to all newborns in Viet Nam.
 - Educated mothers on the importance of vaccines and taking preventive actions against infectious diseases.
- 2001 – 2003 **Research assistant**, Dr. Charles Lieber's Physical Chemistry Research Lab
Investigator: Charles Lieber, PhD
Address: 12 Oxford Street, Room M-008, Cambridge, MA 02138
Contact #: 617-496-3169
- Synthesized small-diameter silicon nanowires (SiNWs) to examine quantum effects.
 - Developed semiconductor nanosensor for real-time rapid detection of biological macromolecules and chemical species.
 - Learned several physical chemistry techniques: photolithography, e-beam lithography, developed PDMS stamp, thermoevaporator, e-beam evaporator, atomic force microscopy (AFM) and scanning electron microscopy (SEM).

PROFESSIONAL ACTIVITY

Professional membership

- International Society for Pharmacoeconomics and Outcomes Research
- International Society for Pharmacoepidemiology
- American Public Health Association
- Society for Clinical Trials
- Society for Medical Decision Making
- US Cochrane Center

Meeting organized

- Dr. David Sackett Visiting Scholar meeting, April 18-20, 2011, Johns Hopkins Bloomberg School of Public Health

EDITORIAL ACTIVITY

Peer review activity

- *Journal of the American Medical Association*

HONORS AND AWARDS

- 2012 *Abraham Lilienfeld Award* recognizes outstanding student in the critical area of applied epidemiology. Department of Epidemiology, Johns Hopkins Bloomberg School of Public Health.
- 2011 *American Public Health Association Medical Care Section Student Presentation Award* recognizes students in public health who have submitted particularly meritorious research which dovetails with the interests and goals of the Medical Care Section of APHA.
- 2011 *Charlotte Silverman Award* recognizes outstanding commitment to public health, policy, and community outreach. Department of Epidemiology, Johns Hopkins Bloomberg School of Public Health.
- 2010 *American Public Health Association Trong Nguyen Memorial Award* recognizes significant leadership contribution in the field of public health, American Public Health Association awarded in Denver, Colorado.
- 2010 *Dorothy and Arthur Samet Award* recognizes outstanding service to the Department and/or community by a Department student. Department of Epidemiology, Johns Hopkins Bloomberg School of Public Health.
- 2010 *Student Assembly Dean Award* recognizes outstanding services to the Hopkins community as Student Assembly President. Johns Hopkins Bloomberg School of Public Health.
- 2008 – 2011 *National Eye Institute Training Grant* provides support and stipends to pre-doctoral students focused on clinical trials.
- 2008 *Global Framework Award* provides support to conduct research in Thai Nguyen, Viet Nam.
- 2006 – 2007 *Hopkins Sommer Scholar Award* develops the next generation of public health leaders. Johns Hopkins Bloomberg School of Public Health.
- 2003 – 2004 *Fulbright Fellowship*, Ho Chi Minh City, Vietnam.
- 2003 *AB Cum Laude*, Harvard College.

PUBLICATION

Peer Reviewed Journal Articles

Mody SH, Huynh L, Zhuo DY, Tran KN, Lefebvre P, Bookhart B. A cost-analysis model for anticoagulant treatment in the hospital setting. *Journal of Medical Economics*. 2014. In Press.

Lefebvre P, Coleman CI, Bookhart BK, Wang ST, Mody SH, Tran KN, Zhuo D, **Huynh L**, Nutescu, EA. Cost-effectiveness of rivaroxaban compared with enoxaparin plus a vitamin K antagonist for the treatment of venous thromboembolism. *Journal of Medical Economics*. 2014;17(1):52-64. doi:10.3111/13696998.2013.858634.

Scherer RW, **Huynh L**, Ervin AM, Taylor J, Dickersin K. ClinicalTrials.gov registration can supplement information in abstracts for systematic reviews: a comparison study. *BMC Med Res Methodol*. 2013;13:79. doi:10.1186/1471-2288-13-79.

Huynh L, McCoy M, Law A, Tran KN, Knuth S, Lefebvre P, Sullivan S, Duh MS. Systematic literature review of the costs of pregnancy in the US. *Pharmacoeconomics*. 2013;31(11):1005-30. doi:10.1007/s40273-013-0096-8.

Grossman, E., Keegan, T., Ly, M., Lessler, A., **Huynh, L.**, O'Malley, J., Guadagnoli, E., & Landon, B. Inside the Health Disparities Collaboratives: A detailed exploration of quality improvement at community health centers. *Medical Care*. 2008; 46: 489-496.

Murakami, H., Nguyen, C., Hipgrave, D., & **Huynh, L.** Operation and Cost of Hepatitis B Vaccine Birth-Dose Provision: A Case Study in Viet Nam. *Vaccine*. 2008; 26 (11): 1411 - 1419.

Wu, Y., Cui, Y, **Huynh, L.**, Barrelet, C. Bell, D. & Lieber, C.M. Controlled Growth and Structures of Molecular-Scale Silicon Nanowires. *Nanoletters*. 2004; 4 (3): 433-436.

Reports

Huynh, L. & Yoon, D. Johns Hopkins Center for Cartilage Restoration Business Plan. Master of Business Administration Capstone, December 2007.

Huynh, L., Seaberg, E., & Thio, C. Assessment of serological fibrosis biomarkers in participants from the Multi-Center AIDS Cohort Study (MACS). Master of Public Health Capstone Project, 2007.

Huynh, L. Qualitative Assessment of the Hepatitis B Birth-Dose in Viet Nam. Fulbright Final Report, 2004.

Murakami, H. & **Huynh, L.** World Health Organization Report Operational and Financial Realities of Hepatitis B Vaccine Birth-Dose Provision in Community: Report of Qualitative Assessment in Viet Nam, 2005.

Huynh, L. Approaching the Limit: Miniaturization of Silicon Nanowires to 2 nm for Nanotechnology. Senior Honor Thesis, 2003.

Cui, Y., Wang, W., **Huynh, L.** & Lieber, C.M. "Ultra Sensitive and Selective Multiplexing Detection of Cancer Markers Using Nanowires Nanosensors."

Paper in preparation

Scherer, R., **Huynh, L.**, Ervin, A., Taylor, J., Dickersin, K. “Outcomes reported in conference abstracts and registered in ClinicalTrials.gov: a comparison study”.

Abstracts

Huynh, L., Limakatso, L., Johns, B. & Martinson, N. “Public-Private Partnership Model: Sustainability of the ZuziMpilo Clinic in Johannesburg, South Africa”. American Public Health Association, 2011.

Huynh, L., Scherer, R., Ervin, A., & Dickersin, K. “Primary outcomes reported in abstracts and ClinicalTrials.gov – do they agree?” Cochrane Colloquium, 2011.

Huynh, L. & Frick, K. “Using the Heckman Model to Impute Indirect Financial Burden for the Surgical Treatments Outcomes Project for Dysfunctional Uterine Bleeding (STOP-DUB)”. Society for Clinical Trials Annual Meeting, 2011.

Huynh, L., Gundlach, A., & Go, V. “Diagnosing Organization Performance: A Case Study in Thai Nguyen, Vietnam.” American Public Health Association, 2010.

Huynh, L. & Frick, K. “Cost effectiveness of hysterectomy compared to endometrial ablation in the Surgical Treatments Outcomes Project for Dysfunctional Uterine Bleeding (STOP-DUB) Trial”. Society for Clinical Trials 30th Annual Meeting, 2009.

Frick, K., **Huynh, L.**, & Clark, M. “Complex Determinants of the Least Costly Way to Design a Study to Detect Differences in QALYs with a Given Power”. Society for Medical Decision Making, 2008.

Murakami, H., Ishida, Y., Tanaka, M., & **Huynh, L.** “Multi-country comparative assessment of avian influenza (H5N1) human cases surveillance in Asian countries.” American Public Health Association, 2008.

Huynh, L., Murakami, H., & Hipgrave, D. “Role of Community Health Workers in Implementing National Immunization Program in Developing Countries.” American Public Health Association, 2008.

Huynh, L., Kuehnle, J., Yi, E., & Yoon, D. “Nursing Shortage, strategy, & implication.” American Public Health Association. 2007.

PART II

TEACHING

MASTER OF PUBLIC HEALTH STUDENT MENTORING PROGRAM

Mentee

Katherine Moon

MPH candidate, 2012

CLASSROOM INSTRUCTION, LECTURER

- 2009 – 2011 **Comparative Effectiveness Research: Outcome Measurement** (2 terms), Department of Epidemiology, Johns Hopkins Bloomberg School of Public Health
Lecture given:
- Frequency of follow-up visits

CLASSROOM INSTRUCTION, TEACHING ASSISTANT

Served as teaching assistant for 17 graduate courses (24 terms)

- 2009 – 2011 **Comparative Effectiveness Research: Outcome Measurement** (3 terms), Department of Epidemiology, Johns Hopkins Bloomberg School of Public Health.
- Prepared and organized lecture notes and assignments.
 - Presented lecture on frequency of follow-ups.
- 2011 **Summer Institute: Data Analysis I & II Workshops** (1 term), Department of Biostatistics, Johns Hopkins Bloomberg School of Public Health.
- Attended classes, answer students' questions, and grade in-class exercises.
- 2011 **Professional Epidemiology I** (1 term), Department of Epidemiology, Johns Hopkins Bloomberg School of Public Health.
- Attended classes and weekly instructors' meetings.
 - Led lab discussions.
 - Held office hours.
 - Graded assignments.
- 2011 – 2012 **Winter Institute: Data Analysis I & II Workshops** (2 terms), Department of Biostatistics, Johns Hopkins Bloomberg School of Public Health.
- Attended classes.
 - Answered students' questions.
 - Graded in-class exercises.
- 2011 **Winter Institute Epidemiology Workshop: Interpreting and Using Epidemiologic Evidence** (1 term), Department of Epidemiology, Johns Hopkins Bloomberg School of Public Health.
- Attended instructors' meeting and classes.
 - Prepared lab questions.
 - Led lab discussion.
 - Graded lab and final assignments.

- 2010 **Applications of Case-Control Study** (1 term), Department of Epidemiology, Johns Hopkins Bloomberg School of Public Health.
- Attended classes.
 - Headed lab discussions.
 - Developed final exam.
- 2010 **Pharmacoepidemiology** (1 term), Department of Epidemiology, Johns Hopkins Bloomberg School of Public Health.
- Attended classes, monitored course website, and developed final exam.
- 2008 – 2010 **Understanding Cost-Effectiveness** (2 terms), Department of Health Policy and Management, Johns Hopkins Bloomberg School of Public Health.
- Assisted with online discussion.
 - Answered student's question.
 - Graded assignments.
- 2009 - 2010 **Epidemiologic Methods 2 & 3** (2 terms), Department of Epidemiology, Johns Hopkins Bloomberg School of Public Health.
- Attended classes, conducted lab discussions, and graded assignments and exams.
- 2008 – 2010 **Statistical Methods in Public Health I-IV** (5 terms), Department of Biostatistics, Johns Hopkins Bloomberg School of Public Health.
- Led eight lab discussions and eight STATA labs.
 - Graded problem sets and exams.
 - Assisted students with their statistical project.
- 2008 **Health Care Epidemiology** (1 term), Department of Epidemiology, Johns Hopkins Bloomberg School of Public Health.
- Modified past assignments and projects.
 - Graded student assignments and projects.
 - Answered questions and concerns related to the course.
- 2008 -- 2010 **Principles of Epidemiology** (2 terms), Department of Epidemiology, Johns Hopkins Bloomberg School of Public Health.
- Answered students' questions.
 - Held office hours.
 - Attended classes.
 - Led lab discussion.
 - Graded assignments.
 - Proctored exam.

- 2007 – 2008 **Fundamentals of Budgeting and Financial Management** (2 terms), Department of Health Policy and Management, Johns Hopkins Bloomberg School of Public Health.
- Attended lectures, held office hours, oversaw course curriculum, and answered questions and concerns students may have on finance and management.

ACADEMIC SERVICE

- 2009 – 2011 ***President-elect, President, & Ex-officio, Student Assembly***, Johns Hopkins Bloomberg School of Public Health.
- Led executive committee meetings.
 - Represented on behalf of Student Assembly to University, local, state, national, and international agencies and organizations.
 - Provided support and assistance to team of 34 members.
 - Delegated tasks to members.
 - Served as the channel of communication between administrators and over 2,000 students at the school.
- 2010 – 2011 ***Service Chair, Epidemiology Student Organization (ESO) STARS***, Johns Hopkins Bloomberg School of Public Health.
- Developed public health curriculum for local high school and recruited graduate students to teach public health and epidemiology to high school students.
- 2009 – 2012 ***DrPH Student Representative, DrPH Executive Committee***, Johns Hopkins Bloomberg School of Public Health.
- Represented and advocated students' interests.
- 2010 – 2011 ***Student Leader, DrPH Student Network***, Johns Hopkins Bloomberg School of Public Health.
- Created platform for students to exchange ideas, network, and gain competency skills in informal settings.
- 2010 – 2011 ***Co-Founder, Vice-President, Application and Methods of Bayesian statistics in Epidemiologic Research (AMBER)***, Johns Hopkins Bloomberg School of Public Health.
- Developed mission and application proposal.
 - Assisted in conducting bi-monthly meetings.
- 2009 – 2010 ***Captain, Intramural volleyball***, Johns Hopkins Bloomberg School of Public Health.
- Organized and managed Epidemiology intramural volleyball team, the Confounder
- 2008 – 2009 ***Coordinator, Clinical Trials and Systematic Reviews Journal Club***,

Johns Hopkins Bloomberg School of Public Health.

- Organized journal club meetings.
- Coordinated with students to present relevant articles.

COMMUNITY SERVICE

- | | |
|--------------------|---|
| 2002 --
Present | <p><i>Co-Founder, President, VietHope, Inc.</i> 501(c)(3) non-profit corporation.</p> <ul style="list-style-type: none">• Assist children in Viet Nam to grow with an opportunity to reach his/her full potential through the Scholarship Program.• Provide financial assistance to over 5,000 children living in poor rural areas in Viet Nam who cannot afford the cost of continuing an education within the financial limits of their family.• Oversee VietHope's educational projects (construction of elementary school, libraries, and computer rooms). |
| 2001 – 2004 | <p><i>Director, Hepatitis B Prevention and Education in Boston Initiative (H.B.I.).</i></p> <ul style="list-style-type: none">• Promoted higher awareness for Hepatitis B vaccinations to Asian immigrants in the Greater Boston community.• Organized and managed two clinics in Chinatown and Malden.• Performed outreach activities in Chinatown, Boston. |

PRESENTATION

Scientific Meetings (see also published abstracts)

Oral

- **Huynh, L.**, Limakatso, L., Johns, B. & Martinson, N. "Public-Private Partnership Model: Sustainability of the ZuziMpilo Clinic in Johannesburg, South Africa". American Public Health Association. Washington, DC, 2011.
- **Huynh, L.**, Scherer, R., Ervin, A., & Dickersin, K. "Primary outcomes reported in abstracts and ClinicalTrials.gov – do they agree?" Cochrane Colloquium. Madrid, Spain, 2011.
- Murakami, H., Ishida, Y., Tanaka, M., & **Huynh, L.** "Multi-country comparative assessment of avian influenza (H5N1) human cases surveillance in Asian countries." American Public Health Association, 2008.
- **Huynh, L.**, Kuehnle, J., Yi, E., & Yoon, D. "Nursing Shortage, strategy, & implication." American Public Health Association, 2007.

Poster

- **Huynh, L.** & Frick, K. “Using the Heckman Model to Impute Indirect Financial Burden for the Surgical Treatments Outcomes Project for Dysfunctional Uterine Bleeding (STOP-DUB)”. Society for Clinical Trials Annual Meeting, 2011.
- **Huynh, L.**, Gundlach, A., & Go, V. “Diagnosing Organization Performance: A Case Study in Thai Nguyen, Viet Nam.” American Public Health Association, 2010.
- **Huynh, L.** & Frick, K. “Cost effectiveness of hysterectomy compared to endometrial ablation in the Surgical Treatments Outcomes Project for Dysfunctional Uterine Bleeding (STOP-DUB) Trial”. Society for Clinical Trials 30th Annual Meeting, 2009.
- **Huynh, L.**, Murakami, H., & Hipgrave, D. Role of the Community Health Workers in the Delivery of the Hepatitis B Vaccine in Vietnam. American Public Health Association, 2008.
- Frick, K., **Huynh, L.**, & Clark, M. “Complex Determinants of the Least Costly Way to Design a Study to Detect Differences in QALYs with a Given Power”. Society for Medical Decision Making, 2008.
- **Huynh, L.**, Murakami, H., & Hipgrave, D. “Role of Community Health Workers in Implementing National Immunization Program in Developing Countries.” American Public Health Association, 2008.

INVITED SEMINAR AND PRESENTATION

- | | |
|------|---|
| 2012 | <i>Presentation for FDA Public Hearing Modernizing the Regulation of Clinical Trials and Approaches to Good Clinical Practice</i> , Presented at the Food and Drug Administration, April 2012. |
| 2011 | <i>Application of Discrete Event Simulation (DES) in Urgent Care Setting using Radio-Frequency Identification (RFID) Data</i> , Presented at the Department of Epidemiology, MOS-DEF seminar, Johns Hopkins Bloomberg School of Public Health. April, 2011. |
| 2010 | <i>Introduction to Discrete Event Simulation</i> , Presented at the Department of Health, Policy & Management, Modelling Seminar, Johns Hopkins Bloomberg School of Public Health. March, 2010. |
| 2009 | <i>Simulation to Guide Efficient Clinical Trials Design to Detect Differences in Health-related Quality of Life</i> , Presented at the Department of Epidemiology, Doctoral seminar, Johns Hopkins Bloomberg School of Public Health. August, 2009. |

ADDITIONAL INFORMATION

Computer skill:

Stata, SAS, R, Arena (Rockwell Automation), MySQL, TreeAge.

Language skill:

Fluent in Vietnamese. Knowledge of Spanish, French, Latin and Greek.

Statement of research interest:

My research focuses on developing discrete event simulation methods that epidemiologists can implement in their research setting to design cost-efficient studies examining patient-reported outcomes without compromising power and study characteristics. The applied methods help investigators to explicitly consider different design parameters and investigate how these decisions influence the study characteristics. Thereby, the applied methods may help to reduce the multi-dimensionality of decisions in making complex trade-offs.

Keyword

Randomized controlled clinical trial, epidemiology, biostatistics, systematic review, adaptive design, Bayesian method, discrete event simulation, evidence-based health care, cost-effectiveness, cost-utility, cost-efficiency, cost function.

KIMBERLY SHORES, FSA, MAAA

Vice President

Consulting Actuary, Kansas City Office

Prior Positions

2005-2013: Coventry Health Care, Director of Actuarial Services

2001-2005: Lewis and Ellis, Sr. Actuarial Consultant

2000-2000 Business Men's Assurance, Actuarial Student

1997-2000: Americo Life, Actuarial Student

Responsibilities and Experience

- Reserving / IBNR
- Annual Statement Opinion
- Commercial group pricing and rate adequacy
- Individual medical pricing and rate adequacy
- Provider contracting analysis
- Trend analysis
- Financial forecasting (Group & Individual)
- Budget support
- Medical expense / Medical economics research
- Additional pricing analysis: Area factors, age/gender studies, SIC studies, benefit slope, etc.
- Experience studies
- Competitive rate studies
- Rate filings and certifications

Education

William Jewell College – Liberty, Missouri

B.A., Mathematics and Chemistry

Professional

Fellow, Society of Actuaries

Member, American Academy of Actuaries

CERTIFICATE OF SERVICE

The undersigned, an attorney, hereby certifies that on July 28, 2014, a true and correct copy of the foregoing was filed electronically via CM/ECF, which caused notice to be sent to all counsel of record.

By: /s/ Steve W. Berman